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SCHEME OF SOUND SYMBOLS

FOR THE PRONUNCIATION OF WORDS.

Note.—(-) is the mark dividing words respelt phonetically into syllables; (′), the accent indicating on which syllable or syllables the accent or stress of the voice is to be placed.

Sound-symbols employed in Respelling.	Representing the Sounds as exemplified in the Words.	Words respelt with Sound-symbols and Marks for Pronunciation.
ā	mate, fate, fail, aye	*māt, fāt, fāl, ā.*
ă	mat, fat	*măt, făt.*
â	far, calm, father	*fâr, kâm, fâ′ṫher.*
ã	care, fair	*cãr, fãr.*
aw	fall, laud, law	*fawl, lawd, law.*
ē	mete, meat, feet, free	*mēt, mēt, fēt, frē.*
ĕ	met, bed	*mĕt, bĕd.*
ė	her, stir, heard, cur	*hėr. stėr, hėrd, kėr.*
ī	pine, ply, height	*pīn, plī, hīt.*
ĭ	pin, nymph, ability	*pĭn, nĭmf, ă-bĭl′ĭ-ṫĭ.*
ō	note, toll, soul	*nōt, tōl, sōl.*
ŏ	not, plot	*nŏt, plŏt.*
ô	move, smooth	*môv, smôṫh.*
ö	Goethe (similar to *e* in her)	*gö′ṫėh.*
ow	noun, bough, cow	*nown, bow, kow.*
oy	boy, boil	*boy, boyl.*
ū	pure, dew, few	*pūr, dū, fū.*
ŭ	bud, come, tough	*bŭd, kŭm, tŭf.*
û	full, push, good	*fûl, pûsh, gûd.*
ü	French plume, Scotch guid	*plüm, güd.*
ch	chair, match	*chär, măch.*
ċh	German buch, Heidelberg, Scotch loch (guttural)	*bôċh, hī′dėl-bĕrċh, lŏċh.*
g	game, go, gun	*gām, gō, gŭn.*
j	judge, gem, gin	*jŭj, jĕm, jĭn.*
k	king, cat, cot, cut	*kĭng, kăt, kŏt, kŭt.*
s	sit, scene, cell, city, cypress	*sĭt, sēn, sĕl, sĭt′ĭ, sī′prĕs.*
sh	shun, ambition	*shŭn, ăm-bĭsh′ŭn.*
ṫh	thing, breath	*ṫhĭng, brĕṫh.*
ṫh	though, breathe	*ṫhō, brēṫh.*
z	zeal, maze. muse	*zēl, māz, mūz.*
zh	azure, vision	*ăzh′er, vĭzh′ŭn.*

MARBLE, n. *mâr'bl* [F. *marbre*—from L. *marmŏrem*; Dut. *marmer*, marble]: calcareous stone susceptible of a high polish; anything made of marble; certain rocks susceptible of a fine polish (see below). Also a little stone ball used by boys in play, made in Saxony and exported to various countries: hard calcareous stone is broken into small cubical blocks, of which about 150 at once are thrown into a mill of revolving stone and oak slabs, which grinds, rounds, and polishes the marbles in about 15 minutes. M. denotes also a stone remarkable for some inscription or sculpture: V. to variegate or vein in imitation of marble: ADJ. made of marble; variegated or veined like marble; hard; insensible. MARBLING, imp. *mâr'bling*: N. the art or practice of coloring in imitation of marble. MAR'BLED, pp. *-bld*: ADJ. stained with irregular streaks or veins of color. MAR'BLER, N. *-blėr*, one who veins paper-work, wood, stone, etc., in imitation of marble. MAR'BLY, ad. *-blė*, in the manner of marble. MARBLE-HEARTED, hard-hearted; cold; cruel.

MARBLE: species of stone of calcareous nature, close texture, and capable of receiving a fine polish. The genuine M. is more crystalline in texture than the ordinary limestone, which it otherwise closely resembles. It can be artificially formed by burning limestone sufficiently to destroy the impurities which it contains. By this process the stone becomes white, and if not overheated it retains its strength and texture. This change is often seen at lime-kilns when some of the outer blocks of stone are not sufficiently burned to form lime for commercial uses. This indicates that M. was formed from lime which was deprived of its coloring matter by the action of heat.

There are many kinds of M. varying greatly in appearance and value. By far the larger portion contains various impurities which mar its beauty and diminish its utility. M. was used to some extent by the ancient Egyptians, and many of the magnificent Greek and Roman structures, the admiration of succeeding ages, were of this material. In both ancient and modern times M. has been used in exterior and interior adornment of costly houses and fine public buildings of other materials. It has also been, and remains, the favorite material for the sculptor. The principal kinds of M. used by the famous Greek sculptors were the Pentelic, obtained in Attica, and the Parian, from the island of Paros. This variety was preferred by sculptors, but for building purposes the Pentelic was extensively used. The Parthenon at Athens was built of this kind of M. It is somewhat whiter than the Parian M., but is more readily disintegrated by exposure to the elements. The Romans obtained their M. from Carrara in Italy, whence is secured a portion of the stone used by modern sculptors. It is remarkably free from impurities, and readily takes a very high polish. The texture is firm, but the grain is not as fine as in some other varieties.

M. is very widely distributed in both the old and the

new world it varies greatly in appearance and quality. In color it ranges from the purest white through all the intermediate shades to an intense black. The finer grades are very valuable, often selling as high as $20 per cubic ft.; but the lower qualities are worth little if any more than ordinary limestone. The color of some varieties is due to the presence of organic matter. Much of the M. quarried near Chicago appears white when taken from the earth, but becomes discolored by exposure to the weather. The change in appearance seems to be due to the action of the air on a small proportion of petroleum which the stone contains.

In quantity the colored varieties of M. far exceed the white, but the white is much more valuable for either architectural or ornamental purposes, and is almost wholly used by sculptors. In the United States, M., both white and colored, is found in numerous localities. There are large deposits also in Canada. The three states of O. Ill., and Iowa, furnish about one half the quantity of M. quarried in this country. Large quantities are obtained in Vt., whence comes the finest quality thus far discovered in deposits of any extent in America. In Rutland there is a layer of as fine color as the Carrara M., but of slightly inferior texture: it is only three or four ft. in thickness, and is found in a bed of clouded M. 40 or 50 ft. thick. It is used for statuary. The quarries at this place furnish nearly all the M. suitable for use of sculptors that is found in the United States.

A very fine grade of black M. is found at Shoreham, Vt.; and handsomely mottled M. is found in many places. The largest quarries of colored M. are in e. Tenn.: the product is known as 'Tennessee M.,' and is extensively used for interior decoration of buildings, for furniture, etc. It is beautifully mottled and is more readily worked than most of the colored varieties found farther north.

Considerable M. is found in Colorado and Montana; and one of the most extensive deposits in the world has been discovered in California. The latter contains many different shades of colored and variegated M., and large quantities of pure white M. of very fine texture. Excellent M. for building purposes is plentiful in the w. parts of Mass. and Connecticut.

Deposits of M. vary in thickness from comparatively thin layers to 600 ft. The upper portion of the stone is usually of little value, as it has been cracked and weakened by the action of heat and moisture. Gunpowder and other explosives are not used in M. quarries, as they shatter and waste the valuable stone. Blocks are cut around with drills or chisels worked usually by steam, the center piece is removed, and the others are cut by horizontal drills which are run at the proper depth to give the block the thickness required. The subsequent cutting of the stone is done with saws of strips of soft iron driven by steam. The cutting power of these saws is greatly increased by a liberal supply of sand and water. After being sawn to the required size and

thickness the blocks of marble are polished by rubbing with sand of varying degrees of fineness, the process being finished by the use of extremely fine emery powder. Most of this work is done with machines, but the finishing touches are by hand power.

Many thousand tons of marble are used every year in the United States in the form of dust, to generate carbonic acid gas for soda fountains, for which purpose it is one of the cheapest and best materials known. Importations of marble, mostly in rough blocks, amount in value to nearly half a million dollars per year. The production in the United States for 1906 was valued at $7,339,125.

MARBLEHEAD, *mâr-bl-hĕd':* seaport town in Essex county, Mass., on Massachusetts Bay, 16 m. n.e. of Boston, 4 m. s.e. of Salem; on a high, rocky peninsula (about 3,700 acres) 4 m. long, 2 m. broad; terminus of short branches of the Boston & Maine railroad. It has a deep, capacious, easily accessible, and nearly land-locked harbor; and was early a place of prosperous commerce, and later was largely engaged in fisheries. Recently these interests have declined, and the shoe-manufacture has become prominent. Marblehead is also becoming a very favorite summer resort and a rendezvous for yachts. The town was settled by emigrants from the Channel Islands, and some of their peculiar idioms and quaintness of manner are still traceable in their descendants. The place has many interesting features. It has a national bank, savings bank, newspaper, and well-conducted schools. Marblehead has always been ardently patriotic: it sent 1,000 men to the army of the revolution, and 1,440 to the civil war. At the close of the revolutionary war, there were 600 widows; and at the end of the war of 1812 Marblehead had 500 citizens prisoners of war in England. A fire, 1877, which swept away most of its business portion, was a disastrous check to its prosperity. Pop. (1900) 7,582; (1910) 7,338.

MAR'BLING: in bookbinding, a process of ornamenting the edges of books. After the edges of the book have been cut by the plough (see BOOKBINDING) the book is tied between two boards and taken to the trough, a vessel 2 inches deep, which is filled with clean gum water. Various colored pigments, ground in spirits of wine and mixed with a small quantity of ox gall, are thrown upon the surface of the gum water, and disposed in various forms with a quill and comb, according to the required pattern. This being obtained, the edges of the book are dipped into the trough, and the colors adhere. Cold water is then dashed over the edges, which sets the colors and brings them out clear.

MARBURG, *mâr'bûrch:* interesting old German town, in the Prussian province of Hesse-Nassau, on both banks of the Lahn, 50 m. n. of Frankfurt-on-the-Main, 49 m. s.w. of Cassel. Its situation is strikingly beautiful; it is

chiefly on a hill, round which are quaint, old-fashioned houses, interspersed with buildings of later date, and separated by terrace-gardens. The hill is crowned by the stately burg or castle, and at its base extends the lovely valley of the Lahn. Of ecclesiastical edifices, the principal is the fine church of St. Elizabeth, a gem of the purest early Gothic, begun 1255, completed 1283, having two towers 303 ft. in height. It was erected in honor of St. Elizabeth of Hungary (q.v.), daughter of Andreas II. of Hungary, and wife of Ludwig, Landgraf of Hesse and Thuringia. From her, the ancestress of the Cassel and Darmstadt branches of the House of Hesse, is descended the present Princess (Alexandra) of Wales. The castle of Marburg was built 1065. In one of its halls the conferences between the Wittenberg and Swiss reformers regarding the Lord's Supper took place. The Univ. of Marburg was founded 1527 by Philip the Magnanimous, Landgraf of Hesse. It was the first established without Papal privileges, and soon became one of the most flourishing in Prot. Europe. Among its earliest students were the celebrated Patrick Hamilton, and William Tyndale, translator of the English Bible. The university has four faculties—Theology, Jurisprudence, Medicine, and Arts; and comprises about 90 professors and 1,200 students; its library has 140,000 vols. Extensive potteries and tanneries are in operation. Pop. 17,500.

MAR'BURY v. MADISON: a well-known decision in law handed down in 1803 by the United States Supreme Court. It is important as affording the earliest instance of the declaration by the court that a congressional statute is null and void by reason of its repugnance to the constitution of the United States. Marbury was appointed justice of the peace in the District of Columbia by President Adams, but the commission, though drawn up, signed, and sealed, had never been delivered. Madison, when he became secretary of state, refused to deliver it. An act of congress empowered the United States Supreme Court to issue to executive officers a writ of mandamus to force them to attend to their duties, and on the basis of this act Marbury brought suit. Now the constitution nowhere mentions the right to issue a writ of mandamus among the cases of original jurisdiction by the Supreme Court. Chief Justice Marshall therefore decided against Marbury, and his argument, admittedly the only accurate one, established an important precedent which is found only in the courts of the United States.

MARC, n. *mârk* [F. *marc*]; the refuse matter of grapes or other fruit from which the juice has been expressed.

MARC, *mârck:* weight for gold or silver; coin. See MARK (standard weight).

MARCANTO'NIO: engraver. See RAIMONDI.

MARCASITE, n. *mâr'kă-sīt* [F. *marcassite*—from Ar. *mawrkjassidd* or *marqachitha*, like a shining, fire-giving stone]: white iron pyrites, occurring crystallized in modified rhombic prisms, in stalactite crusts, etc., nearly tin-white, and more strongly metallic in lustre than ordinary pyrites; used in the manufacture of sulphur and sulphuric acid, also as an ornamental stone; though opaque it is a rough substitute for diamond, because of its brilliant lustre when polished. The name Marcasite, formerly applied to all crystallized and radiated pyrites, is now restricted to those forms of native bisulphide of iron which crystallize in the orthorhombic system—called sometimes 'prismatic iron pyrites.' MARCASIT'IC, a. *-sĭt'ĭk*, pertaining to or resembling marcasite.

MARCATO, *mâr-kâ'tō*, in Music: in a strongly accentuated or marked manner.

MARCELINE, n. *mâr'sĕl-ĭn* [F.—from L. *marceo*, I am weak or thin]: a thin silk tissue used for linings, etc., in ladies' dresses.

MARCELLIAN, n. *mâr-sĕl'lĭ-an:* in *chh. hist.*, follower of Marcellus, Bp. of Ancyra, in the 4th c., who, in his zeal against Arianism, ran into Sabellianism.

MARCEL'LUS II. (MARCELLO CERVINI), Pope of Rome: b. in the Mark of Ancona; d. 1555, Apr. 30, having been pope only 21 days. As cardinal he was very prominent in the discussions of the Council of Trent, over which he was appointed to preside as legate of Julius III., whom he afterward succeeded in the pontifical chair. His feeble health gave way under the exhaustion of the conclave which elected him and the elaborate ceremonial of his accession. He had high repute for ability and integrity. He is remarkable from the minor but curious circumstance of his not complying with the ancient custom by which the pope, on his election, lays aside his baptismal name, and assumes a new one.

MARCELLUS, *mâr-sĕl'ŭs*, MARCUS CLAUDIUS: Roman warrior: about B.C. 268-208; of one of the most eminent plebeian families. He was consul for the first time B.C. 222, and obtained a decisive victory over the Insubrians in Cisalpine Gaul, slaying with his own hand their king, Britomartus or Viridomarus, whose spoils he dedicated to Jupiter; for this success Marcellus was honored with a triumph. This was the third and last occasion in Roman history on which *spolia opima* were offered to the gods. In the Second Punic War, Marcellus fought as pretor, B.C. 216, against Hannibal at Nola, in Campania; and the victory which he gained was the more important, as it showed that Hannibal was not invincible, and that the Romans had not been irreparably overthrown at Cannæ. In the course of two years, he thrice repulsed the Carthaginian general at this place. Being consul again B.C. 214 he was intrusted with the command of the war in

Sicily. He took Leontini, massacring in cold blood 2,000 Roman deserters whom he found there, and then advanced against Syracuse, which he tried to storm. All his efforts were rendered unavailing by the skill of Archimedes (q.v.), and he was compelled to regularly blockade the city. Famine, pestilence, and, ultimately, treachery, on the part of the Spanish auxiliaries of the Syracusans, enabled Marcellus to make himself master of the place B.C. 212, after which the remainder of Sicily was soon brought under Roman dominion. He was the first Roman general who adopted the practice (afterward common) of despoiling conquered cities of their works of art. B.C. 210 he was again consul, and was again opposed to Hannibal, with whom he fought an indecisive battle at Numistro, in Lucania; and by whom he was defeated at Canusium, in Apulia, B.C. 209; but on the day following retrieved the defeat. B.C. 208 he was for the fifth time elected to the consulate, and assumed once more the command of the Roman army against Hannibal. When out reconnoitering, he fell into an ambuscade, and was slain. The Carthaginian general treated his remains with honor.—It ought to be noticed that the accounts of Marcellus's life given by Livy, Plutarch, and others are believed to be much colored and distorted—as Polybius, one of the best and most trustworthy authorities on the Punic War, denies that Marcellus ever defeated Hannibal at all.

MARCESCENT, a. *mâr-sĕs'sĕnt* [L. *marces'cens*, or *marcescen'ten*, pining away or decaying; decaying; fading; in *bot.*, gradually withering, but not falling off until the part bearing it is perfected. MARCES'CIBLE, a. *-sĭ-bl*, liable to decay or fade.

MARCH, n. *mârch* [F. *marche*, march, walk; *marcher*, to walk—from mid. L. *marcārĕ*—from L. *marcus*, a hammer: Bret. *marc'h;* W. *march*, a horse: It. *marciare*, to walk]: deliberate, regular, stately walk; the journey of troops from one place to another; the movement of soldiers in order; slow or laborious walk; movement; progression; signal to move. Also, a piece of music fitted to accompany the movement of troops, or composed after the measure of the march of troops, chiefly for military bands, with wind instruments; there are slow and quick marches, also marches peculiar to different countries: V. to move in order by steps; to cause to move; to walk in a stately, deliberate manner. MARCH'ING, imp.: ADJ. pert. to a march; moving: N. military movement; passage of soldiers. MARCHED, pp. *mârcht.*

MARCH: market-town of Cambridgeshire, England, 29 m. n. from Cambridge, on the Old Nen. In the neighborhood is *March Wet Fen*, a drained fen with an area of 3,600 acres. Pop. of town 6,190.

MARCH, n. *mârch* [mid. L. *Marcĭŭs;* L. *Martĭŭs*, the month of Mars—from L. *Mars*, the god of war—*lit.*, the

month belonging to Mars]: third month of the year; first month of the old Roman year, comprising 31 days. It was considered the first month of the year in England until the change of style 1752, and the legal year was reckoned from Mar. 25. The Anglo-Saxons called it *Hlyd monath*, stormy month, and *Hraed monath*, rugged month. There is an old proverb, still in vogue with the English and Scotch rustics, which represents March as borrowing three days from April; and in *The Complaynt of Scotland* they are thus described:

> The first it shall be wind and weet;
> The next it shall be snaw and sleet;
> The third it shall be sic a freeze
> Shall gar the birds stick to the trees.

But it is disputed whether these 'borrowed days' are the last three of March or the first three of April. MARCH-MAD, rash to an extreme—in allusion to March being the rutting time of hares, when they are very excitable.

MARCH, FRANCIS ANDREW, A.M., D.C.L., LL.D., L.H.D.: author: b. Millbury, Mass., 1825, Oct. 25. He graduated at Amherst 1845; was tutor there 1847-49; was admitted to the bar in New York 1850; taught in Fredericksburg, Va., 1852-55; and became tutor in Lafayette College 1855, adjunct professor 1856, professor of English language and comparative philology 1857, and lecturer in the law dept. 1877. In 1907, he became professor emeritus. He received the degree LL.D. from the College of N. J. 1870, and Amherst 1871, and L.H.D. from Columbia 1887; was elected president of the American Philological Assoc. 1873, and of the Spelling Reform Assoc. 1876. He ranks as an authority in his department of study. And as such, was chosen as a member of the International Congress of Arts and Sciences at the World's Fair, St. Louis, 1904. He has published *A Method of Philological Study of the English Language* (New York 1865); *Parser and Analyzer for Beginners* (1869); *Anglo-Saxon Grammar* (1870); *Introduction to Anglo-Saxon* (1871). With his son, F. A. March, Jr., he published, in 1903, a *Thesaurus Dictionary of the English Language.*

MARCHAND, *mâr-shân*, FÉLIX GABRIEL: Canadian legislator and author: b. St. John's, P. Q., 1832, Jan. 9. He was educated at St. Hyacinth College, was admitted a notary public in 1855, entered practice at St. John's, and from 1867 sat for the county of St. John's in the legislative assembly of the province of Quebec. From 1878, Mar. 8, to 1879, Mar. 19, he was provincial secretary, from 1879, Mar. 19 to Oct. 30, was commissioner of crown-lands, and from Jan. 29, 1887, to 1892 speaker of the assembly. In 1897, he became premier, with the treasury portfolio. Subsequent to the invasion at Eccles Hill during the Fenian troubles (1870), he commanded a militia brigade. He did much to improve Canadian journalism, and for many years was proprietor and editor of *Le Franco-Canadien.* He published a *Manuel et Formu-*

laire du Notariat; and also the comedies *Fatenville* and *Erreur n'est pas Compte* in prose, and *Un Bonheur en Attire un Autre* and *Les Faux Brillants* in verse.

MARCHAND, JEAN BAPTISTE THOMAS: French officer and explorer: b. Thoissey, 1863, Nov. 22. He attended the military school at St. Maixent, entered the marine service in 1883, was sent to Senegambia in 1889, and in 1890 explored the sources of the Niger. In 1898, he occupied Fashoda, having established a line of posts between French possessions in West Africa and on the eastern coast, but on the demand of England he was forced to withdraw. He took part in the expedition against China in 1900. Consult: Castellani, *M. l'Africain* (1902); Poirier, *De l'Oubanghi à Fachoda* (1900).

MARCHAND, JOHN BONNETT: 1808, Aug. 27—1875, Apr. 13; b. Greensborough, Penn.: naval officer. He entered the U. S. navy as midshipman 1828; was promoted passed midshipman 1834, lieutenant 1840, commander 1855, captain 1862, and commodore 1866; and was retired 1870. He participated in the Seminole Indian war 1841-2; bombardment of Vera Cruz and capture of Tuspan 1847; Paraguay expedition 1859-60; capture of Fernandina 1862; and battle of Mobile Bay, where he twice rammed the Confederate iron-clad *Tennessee,* 1864, Aug. 5.

MARCHES, n. plu. *mârch'ĕz* [F. *marche,* a military frontier, a march: AS. *mearc,* a mark; Goth. *marka,* a border: comp. Gael. *marc,* a horse; *marcaich,* to ride]: borders of a country not separated by natural boundaries of rivers or mountains; frontiers. THE MARCHES, term formerly applied to the boundaries or the border territories between England and Scotland, also between England and Wales (see MARK): in Scotch *law,* the boundaries of properties. THE MARCHES, in *Italy,* a central region of the kingdom, comprising the provinces Ancona, Ascoli-Piceno, Mascarata, Pisaro, Urbino; 3,751 sq.m.; pop. 966,533; chief city, Ancona, on the Adriatic Sea. MARCH, v. *mârch,* in *Scot.,* to join, as a frontier; to border. MARCH'ING, imp. MARCHED, pp. *mârcht.* MARCH'ER, n. *-er,* the officer who defends the borders of a country. RIDING THE MARCHES, an ancient annual ceremony of perambulating the boundaries of a burgh or township in Scotland.

MARCHESI, *mâr-kā'sē,* MATHILDE: German singer: b. Frankfort-on-Main, 1826, Mar. 26. Her maiden name was Graumann; she studied under Nicolai in Vienna, and in Paris under Garcia, whose assistant she became. A splendid mezzo soprano, she toured Europe for several years, married Salvatore Marchesi, a baritone, in 1852, and in 1854 became professor at the Vienna Conservatory. After three years at Cologne in a like position she removed to Paris in 1868. She was a teacher of rare merit, and author of a method of singing, of two vol-

umes of personal recollections in German (1877; 1888), and of *Marchesi and Music* (1897).

MARCHIALI, *mâr-kē-â'lē,* or MARCHIALY. See IRON MASK, MAN WITH THE.

MARCHING THROUGH GEORGIA: a popular ballad sung during the American civil war, and commemorating Sherman's march to the sea. It was written by H. C. Work (q.v.), 1864, Nov. 16.

MARCHIONESS, n. fem. *mâr'shŏn-ĕs* [It. *marchesa;* mid. L. *marchionis'sa,* a marchioness]: the wife of a marquis or marquess; a lady having the rank of a marquess.

MARCHPANE, n. *mârch'pān* [F. *massepain;* OF. *marcepain,* a bread-lump—from It. *marzapane,* a confection of flour, almonds, and sugar, etc.: L. *massa,* a lump; *panis,* bread]: in *OE.,* a cooked compound of flour, various fruits, and sugar, made into fancy shapes; a seed-cake or a bun; a pasty.

MARCIANIST, n. *mâr'shĭ-an-ĭst:* in *chh. hist.,* follower of a certain Marcianus Trapezita in the time of Justinian. They kept the Jewish Sabbath as a fast. They must not be confounded with the Marcionists.

MARCION, *mâr'shĭ-on:* founder of the Marcionites, an extremely ascetic sect, ordinarily, though with doubtful correctness, ranked among the Gnostics, with whose system some of their doctrines agreed. He is heard of first at Rome, soon after A.D. 139. (The tradition that he was son of the Bp. of Sinope lacks verification.) He was born at Sinope, and was a ship-owner; he died probably not long after 165. At Rome he advanced some of his peculiar doctrines, and made efforts to commend them to the local church, to which also he gave money liberally; but his restless, prying, theorizing intellect constantly led him into opinions and practices too hostile to those of his fellow-Christians to permit of their being passed over in silence. He met at Rome the Syrian Gnostic Cerdon, whose system he took as a basis for a dualistic—and so far Gnostic—system of his own, in some fundamental respects, antagonistic to Christianity. The gospel of Christ, according to him, consisted in the free love of the Good; the Mosaic system, with its motives of rewards and punishments, was mere legality; and there is an irreconcilable opposition between the respective authors of the 'Law' in the Old Testament and of the 'Gospel' in the New, i.e., between the wrathful and sternly just creator of man, and the God who was in Christ. His system is not perfectly known; and it is supposed by some to have assumed three or four aboriginal beings—Good, Evil, Creator, and Matter; but probably his followers generally held to the dual original beings—a good God, and one not good (see GNOSTICS). He proclaimed extreme asceticism; forbade all amusements, ornaments, social elegancies, and refinement; pro-

hibited the use of wine and of flesh; denounced marriage; and all this on the basis of that dualism which he held in common with the Gnostics, which identified all matter with evil—the work of a creator opposed to the good God. His speculations were amazingly grotesque misapplications and misunderstandings of the apostle Paul's profound and spiritual antithesis between the law as given by Moses and the free grace of God as developed and manifested in Jesus Christ. To antagonize the Judaizing elements in the Catholic Church, he took as his mission. Respecting the outward form of worship practiced among his followers, little is known save that it had great similarity—as had their whole religious system—to that of the Manicheans (q.v.): indeed the Marcionites may be regarded almost as the Manicheans of the 2d c. Marcion entirely rejected the Old Testament as an evil work; and of the New Testament, all but the Epistles of Paul, whom he deemed Christ's only true apostle, and the Gospel of Luke, which had also to undergo purification of its errors at his hand. Its first four chapters were omitted, and the fifth he began with the words: 'In the 15th year of the reign of Tiberius Cæsar, God came to Capernaum, a city of Galilee, and spoke on the Sabbath.' Marcion gained multitudes of followers throughout Syria, Egypt, Palestine, and other lands. He made Rome his abode, but journeyed in various countries seeking to gain followers, and hoping to supplant the Catholic Church with Marcionite churches. We read of many Marcionite presbyters and bishops. The greatest success of the strange system was in 150-250; due, as has been pointed out, to the fact that, with most abhorrent errors, 'the sect maintained certain genuine Christian ideas which the Catholic Church had forgotten.' Under Constantine and his successors they were persecuted. In the West with the beginning of the 4th c. they began to be merged in the Manicheans; in the East they subsisted as a distinct party till the 6th c.

MARCONI, *mâr-kō'nē*, GUGLIELMO: Italian inventor and electrical engineer: b. Marzabotto, near Bologna, Italy, 1875, Sep. 23. He was educated at the universities of Bologna and Padua, and so early as 1890 undertook experiments in demonstration of his theory that the electric current readily passes through any substance, and when started in a given direction follows a direct course without the assistance of any sort of conductor. He finally invented an apparatus for wireless telegraphy, which was successfully tested in England and Italy by Sir William Henry Preece, engineer and electrician-in-chief of the English postal-telegraph service. Marconi was the first to perfect the appliances used in space telegraphy, and the first to patent the application of the electric waves discovered by Heinrich Hertz to the purposes of actual telegraphy as distinguished from mere signaling. This remains true in spite of all the discus-

sion respecting the originality of Marconi's work. It was he who combined the important elements of the wireless telegraph that had previously been invented, and to him the scientific triumph of space telegraphy is due. He came to the United States in 1899, there continued his experiments, and in 1900 employed his method in reporting the presidential election of that year. He had already, 1899, Mar. 27, sent messages across the English channel from the vicinity of Boulogne, France, to the South Foreland, England, 32 miles distant. In 1901, Dec., he began his first experiments in transatlantic telegraphy without wires at Signal Hill, at the entrance to the harbor of St. John's, N. F. When his success became apparent through his receiving and plainly distinguishing signals from the Poldhu station, England, the Anglo-American Cable Company, which holds a monopoly from Newfoundland, compelled him to withdraw, and he selected another station at Table Head, on the east of Glace Bay, Cape Breton Island. On Feb. 25-6, 1902, Marconi, on his way to the United States on board the steamship Philadelphia, received signals at a distance of 2,099 miles and worded messages at a distance of 1,551.5 miles. On Dec. 21, 1902, the first official transatlantic telegrams were sent from Table Head. Marconi later, 1903, Jan. 18, sent from the South Wellfleet station, Cape Cod, Mass., direct to Poldhu (3,000 miles), a message from President Roosevelt to King Edward. The Italian government introduced the Marconi system on its warships, and granted an annual subsidy of $200,000. The English government pays royalty for the use of the system on its ships. The system between Nova Scotia and Ireland was opened for commercial service 1907, Oct. 18.

MARCO POLO'S SHEEP, n. *mâr'kō pō'lōz: Ovis poli,* one of the finest species of the genus. It inhabits the high lands of the Thian Shan Mountains, n. of Cashgar and Yarkand. In winter this sheep is grayish brown, white below, with white mane, and white disk on tail: in summer the gray changes to brown. There is a well-defined dark dorsal line. The horns are spiral, and sometimes measure as much as 4½ feet from tip to tip.

MARCOSIAN, n. *mâr-kō'zĭ-an:* in *chh. hist.,* follower of Marcus, an Egyptian Judaizing Christian of the 2d century. The sect possessed a number of apocryphal books, and their opinions seem to have resembled those of the Socinians.

MARCOU, *mâr-kô',* JULES: American geologist: b. Salins, France, 1824, Apr. 20; d. Cambridge, Mass., 1898, Apr. 17. He studied at Besançon and the College de St. Louis in Paris; devoted himself to geology after several journeys through Switzerland, in which he made the acquaintance of Jules Thurmann, to whom he owed an introduction to Louis Agassiz. In 1846, after taking part in the geological survey of the Jura Mountains, he was

appointed assistant mineralogist in the Sorbonne; in 1848, having been appointed traveling geologist to the Jardin des Plantes came to America, explored the Lake Superior country together with Agassiz and made wide and important geological studies in Virginia, Pennsylvania and New Jersey, and after several trips back to Europe settled in Cambridge, where he assisted Agassiz in the Museum of Comparative Zoölogy. From 1853 to 1855 he was in government employ, and from 1875 till shortly before his death was again in the service. Marcou made a section map of the 35th parallel from the Mississippi to the Pacific, and published: *Geological Map of the United States and British Provinces of North America* (1853); *A Catalogue of Geological Maps of America* (1884); *Geology of North America* (1858); *Life, Letters, and Works of Louis Agassiz* (1896).

MAR'CUS AURE'LIUS. See ANTONINUS.

MARCUS GRÆCUS, *grē'kŭs:* pyrotechnist and alchemist, with regard to whose life nothing is known. He must have lived not later than the 11th century, since he is cited by an Arabian physician of that date. In the National Library at Paris are two manuscript copies of a small treatise, entitled *Liber Ignium ad Comburendos Hostes, Auctore Marco Græco,* one of which appears to belong to the 14th and the other to the 15th century. The work contains an account of an explosive substance the ingredients of which are the same as those used in making gunpowder, though differently proportioned. It may have been that Schwartz, the reputed inventor of gunpowder, did nothing more than experiment on the receipts of Marcus Græcus. The treatise also contains the first account that has come down to us of the method of making Greek fire.

MARCY, *mâr'sĭ,* MOUNT: one of the higher Adirondacks, in Keene, Essex co., N. Y.; 5,467 ft. high. It is called sometimes by its Indian name, *Tahawas,* 'cloud-divider.' Lake Tear of the Clouds, 4,327 feet above sea-level, usually considered the main source of the Hudson river, is just southwest of Mount Marcy.

MARCY, *mâr'sĭ,* RANDOLPH BARNES: 1812, Apr. 9—1887, Nov. 22; b. Greenwich, Mass.: soldier. He graduated at the United States Military Academy 1832; took part in the Black Hawk expedition the same year; was promoted 1st lieutenant 1837, and captain for gallantry at Palo Alto and Resaca de la Palma, 1846; engaged in exploration of the Red River country 1852-4, the Seminole Indian war 1857, and the Utah expedition 1857-8; became paymaster and major 1859, inspector-general and colonel U. S. A., and brigadier-general volunteers 1861, and chief of staff to his son-in-law, Gen. McClellan, till 1862, Nov.; and was appointed inspector-general of the military division of the Missouri, 1865, and inspector-general U. S. A. 1878. He was brevetted

brigadier-general and major-general for services during the war 1865, and retired 1881. Marcy published many magazine articles and *Exploration of the Red River in 1852* (1853); *The Prairie Traveller: a Handbook for Overland Emigrants* (1859); *Thirty Years of Army Life on the Border* (1866); and *Border Reminiscences* (1871).

MARCY, *mâr'sĭ*, WILLIAM LEARNED: 1786, Dec. 12—1857, July 4; b. Southbridge, Mass. He graduated at Brown University 1808; taught school; then studied law at Troy, N. Y., and, after admission to the bar, opened an office there. During the war of 1812 he served as lieutenant of volunteers, and was sent with his command to the n. frontier, where, 1812, Oct. 23, he captured the Canadian forces at St. Regis. This exploit gained the recognition of Gen. Dearborn, and enabled him to retire after the expiration of the term of his enlistment, with the rank of captain. In 1816, he was appointed recorder of Troy, but was removed because politically opposed to De Witt Clinton. Thereupon he became editor of the *Troy Budget*, anti-federalist daily. In 1821, he was made adjutant-general of the state militia; 1823, he became comptroller of the state; and 1829, was appointed one of the associate judges of the New York supreme court. In 1831, the democratic party elected him to the U. S. Senate, which office he filled so acceptably that, 1833, he was made governor of the state, and was twice re-elected, but was defeated by William H. Seward when candidate for a fourth time, 1839. 1839-42, he served under Van Buren as one of the commissioners on the Mexican claims; 1843, he was active in carrying New York for Polk, by whom he afterward was made secretary of war, which office he filled with much ability through the trying times of the Mexican war. He was active also in settling the Oregon boundary question, advocated the tariff of 1846, and opposed all interference on the slavery question. At the close of his term he retired to private life; but, 1853, was made secretary of state by President Pierce, holding that office till 1857. His correspondence with Austria relative to the release of the Hungarian Koszta, taken from Austrian custody by Capt. Ingraham of the U. S. navy; his papers on Central American affairs, Danish sound dues, and like topics, proved his diplomatic and statesmanlike ability. At the close of President Pierce's term he again retired to private life, and four months later died suddenly in his study at Ballston Spa, N. Y.

MARDI GRAS, *mâr'dē graw* [F. fat Tuesday]: see SHROVETIDE; the day before Ash Wednesday (q.v.). From very early times in Europe the day was given to carnival and merry-making, and still is in the southern Roman Catholic countries. The custom with its masked parades and street pageants was probably introduced from France into the larger cities of the southern United States early in the 19th c., though it was not till 1837

that it became an institution. The day is celebrated with most splendor in New Orleans, La. There it is a legal holiday; from 2 P.M. the streets are filled with masqueraders. A leading feature is the procession of masked butchers following the gayly garlanded fat ox (*bœuf gras*); to which is added, since 1872, the procession of 'Rex,' or the King of the Carnival, after his arrival has been heralded for days in the newspapers. He begins his march at noon, in the person of a gray-bearded man, preceded by pages bearing his sceptre and keys, and escorted by courtiers and guards in every style of dress. Since 1857 the night parade of the secret order of 'The Mystick Krewe of Comus' is held with gorgeous display, usually illustrating by a series of tableaux, on large floats mounted on wheels, some poem, like Lalla Rookh, or some event in history—every year something new. The similar displays of the 'Twelfth Night Revellers' since 1870 rival those of the 'Mystick Krewe.' The day closes with a grand masquerade ball in the opera house in the evening, where 'Rex' chooses a 'Queen,' whose coronation with extravagant pomp is the culmination of the revels of the day and season.

MAR'DEN, ORISON SWETT, A.B., A.M., LL.B.: American editor and author: b. Thornton, N. H. He was graduated at the Boston University in 1877; at the School of Oratory there in 1879; at the Law School of the same institution in 1881; and in 1882 at the Harvard Medical School. He is founder and editor of *Success,* and vice-president of the Success Company, and is the author of many works, among which are: *Pushing to the Front* (1894); *How to Succeed* (1896); *The Secret of Achievement* (1898); *Character the Grandest Thing in the World* (1899); *The Hour of Opportunity* (1900); *Talks with Great Workers* (1901); *Stepping Stones* (1902); *The Young Man Entering Business* (1903); *Stories from Life* (1904); *Choosing a Career* (1905); *The Power of Personality* (1906); *The Optimistic Life* (1907); etc.

MARDONIUS, *mâr-dō'nĭ-ŭs:* Persian general, was the son of the Satrap Gobryas, and son-in-law of Darius Hystaspes. He commanded the first Persian armament sent against Greece, 492 B.C., when a storm at Mount Athos destroyed his fleet, and his army was beaten in Macedonia. He accompanied Xerxes in his invasion of Greece, of which he had been the chief promoter; and after the battle of Salamis, and the return of Xerxes to Asia, Mardonius was left in occupation at Athens, which he held for 10 months. According to Herodotus he was defeated by Pausanias, and probably killed at the battle of Platæa, 479 B.C.

MARE, n. *mär* [AS. *mœre;* Icel. *mer;* Ger. *mähre;* Dut. *merrie,* a mare: Icel. *mar;* W. *march,* a horse]: the female of the horse; one of the movable supports of a scaffold, somewhat of the size and shape of a horse; a mason's lime-trough. MARE'S-NEST, some fancied discovery which

turns out to be something very absurd or ludicrous, or a hoax. MARE'S-TAIL, a common marsh-plant; the *Hippūris vulgāris*, ord. *Hal'oragĕācĕæ*.

MARÉCHAL, n. *mâr'ā-shăl* [F. *maréchal*, properly one who shoes and takes care of horses—from mid. L. *marĭscăl'cus*]: originally an officer set over the horses and stables of the king; the highest military title in the French army.

MAREE, LOCH, *loċh mâ-rē':* lake in the w. of Ross-shire, Scotland; 12⅜ m. in length, with breadth of from 3 furlongs to 2¼ m., and depth, in some places, of 60 fathoms. Owing to its depth, it never freezes over its whole extent. It is surrounded by mountain scenery which, for wildness and grandeur, is not excelled in Scotland. Its waters flow to the sea by the river Ewe, two m. in length. The loch contains 27 islets, one with remains of an ancient chapel and a graveyard.

MARE ISLAND: island of Cal., off the bay of San Pablo; the site of a U. S. navy-yard, with a floating dock and an arsenal.

MAREMMA, n. *mă-rĕm'ma*, plu. MAREMME [It. *maremma*, corrupted from *maritima*, country by the sea-shore—from *mărĕ*, the sea]: vast marshy region of w. Italy, extending along the sea-coast of Tuscany, from the mouth of the Cecina to Orbitello, 997 sq. m. The Pontine Marshes and the Campagna of Rome are similar districts. Formerly, these Maremme were fruitful and populous plains; but neglect of the water-courses of the district allowed the formation of marshes; and now they have become generators of tertiary fevers, and present an aspect of dreary desolation in the summer months, when the inhabitants flee from their miasmata, injurious alike to man and beast. Leopold II., the late Grand Duke of Tuscany, directed especial attention to the drainage and amelioration of the Tuscan Maremme, and considerable success attended the effort to plant trees in them as a corrective of their malarious effects. The cost of the drainage of the M., 1828–48, was $2,650,000. The arable land in the vicinity of the M. is exuberantly fertile; but the harvests are gathered by hired laborers in the most infected districts, and in their emaciated and livid features may be seen the fatal action of malaria. During winter, the M. is inhabitable, and yields good pasture.

MARENGO, *mâ-rĕn'gō:* village of n. Italy, province of Alessandria, near the Bormida, in the midst of extensive forests. M. was the scene of a memorable battle in which a French army of somewhat more than 20,000 commanded by Bonaparte, defeated and routed 32,000 Austrians, under Gen. Melas, 1800, June 14.

MAREOTIS, *măr-ē-ō'tĭs*, or MAREIA, LAKE: the modern *Birket-el-Mariûlt*, a salt lake or marsh in n. Egypt, extending s. from the city of Alexandria, and separated on its n.w. side from the Mediterranean by a narrow

isthmus of sand. In ancient times, this marshy lake was about 42 m. long, and about 22 m. wide. Its shores were planted with olives and vines, and the papyrus, which grew upon its banks and on its eight islets, was famous for its fine quality. In more recent times, the canals which fed Lake M. were neglected, and its depth and area were much reduced. In the 18th c., the bed had become, in great part, a sandy waste; but 1801, during the war between the English and French, the sea was let in by the English, and it is now again a marshy lake. The passage by which the sea found entrance was subsequently closed by Mehemed Ali. The present dimensions of the lake are about 27 m. long by 25 m. broad.

MARESCHAL, n. *mâr'shăl* [F. *maréchal;* OF. *mareschal*]: a military officer of the highest rank—now usually written MARSHAL: see MARÉCHAL: in *Scot.*, formerly MARISCHAL, n. *mâr'shăl*, as the *Earl Marischal.*

MARGARET, *mâr'ga-rĕt*, called sometimes the 'Northern Semiramis,' Queen of the triple Scandinavian kingdom of Denmark, Norway, and Sweden: 1353–1412 (reigned 1387–97, also regent 1380–87, and practically regent 1397–1412); second daughter of Valdemar III., King of Denmark; she became wife of Hakon VIII., King of Norway. At the death of her father, without direct male heirs, 1375, the Danish nobles, passing over the son of Valdemar's eldest daughter, Ingeborg of Mecklenburg, offered the crown to M. and her husband, in trust for their infant son Olaf. By the death of Hakon, 1380, M. became sole guardian of the young prince, who died 1387, at the age of 17; and such was the discretion with which she had conducted the government during her sole regency, that the estates of both kingdoms concurred in electing her as their joint sovereign ruler. Having received the crown at their hands, she convoked a *landthing*, in which she announced that, with the concurrence of her subjects, she would nominate her grandnephew, Eric of Pomerania, as her successor; and though, owing to Eric's infancy at the time, and his subsequent incapacity, the real power rested in the hands of M., she contented herself from that time with the title of 'Margaret, by the grace of God, daughter of Valdemar, King of Denmark.' At the moment that M. was cementing the union of Norway and Denmark, the condition of affairs in Sweden opened the way for a further extension of her power; for the Swedish king, Albert of Mecklenburg, had so thoroughly alienated the affections of his subjects, that the nobles, declaring the throne vacant, offered to acknowledge M. as their ruler. The queen lost no time in sending an army into Sweden to support her pretensions, and defeated the king's German troops at Leaby, where Albert and his son Eric fell into her hands. Albert remained in prison seven years, during which time M. succeeded in wholly subjugating Sweden; and 1397 she made her triumphal entry into Stockholm, with

her nephew Eric, who shortly afterward was, in his 16th year, crowned king of the three Scandinavian kingdoms. On this occasion, M. brought forward the memorable Act of Union, which she had drawn up with her own hand, and to which were appended the signatures of 17 of the principal men in the three kingdoms. By this remarkable act, known as the Union of Calmar, from the place at which it was signed and first promulgated, it was stipulated that the three kingdoms should remain forever at peace under one king, retaining their own laws and customs; and that, at the death of the sovereign, if he left several sons, one of their number should be chosen by the combined estates of the three realms, who were also to elect a new king in the event of the deceased monarch having died childless. At the death of M., this utopian scheme utterly broke down.

MAR'GARET (properly MARGUERITE MARIE THÉRESE JEANNE DE SAVOIE), Queen of Italy: b. Turin, 1851, Nov. 20; daughter of Duke Ferdinand of Genoa and Princess Elizabeth of Saxony. She received a most careful education, made a special study of Italian history, and has so endeared herself to her people that they speak of her as 'the Star of Italy.' She was married to her cousin Humbert, Crown Prince of Italy, 1868, Apr. 20; resided with him at Naples (where their only child, Victor Emmanuel, Prince of Naples, was born 1869, Nov. 11) till Rome became the cap. of united Italy 1871; and ascended the throne with him on the death of his father 1878, Jan. 9. She has been active in promoting the industrial, educational, and charitable interests of the kingdom, and to her is due the revival of the apparently lost art of Burano lace-making.

MARGARET OF ANGOULEME: see MARGUERITE DE VALOIS.

MAR'GARET OF ANJOU, *ŏng-zhô'*: the Queen of Henry VI. of England: 1429, Mar. 24—1482, Aug. 25; b. Pont-à-Mousson, Lorraine; daughter of René of Anjou, Count of Guise and titular king of Sicily, and of Isabella of Lorraine. She was married to Henry VI. of England 1445; and her husband being a person of very weak character, she exercised almost unlimited authority over him, and was the virtual sovereign of the realm; but a secret contract at her marriage, by which Maine and Anjou were relinquished to the French, excited great dissatisfaction in England. The strife between the English and French, which lost to the former the whole of their possessions in France except Calais, was charged upon Margaret. In 1450 occurred the insurrection of Jack Cade, and soon afterward the country was plunged into the horrors of that bloody civil war known as the *War of the Roses* (q.v.). After a struggle of nearly 20 years, M. was defeated and taken prisoner at Tewkesbury, and imprisoned in the Tower, where she remained five years, till Louis XI. redeemed her for 50,000 crowns. She then retired to France, and died at the chateau of Dampierre, near Saumur, in Anjou.

MAR'GARET OF AUSTRIA, Duchess of Savoy, and Regent of the Netherlands: 1480, Jan. 10—1530 (regent 1507–30); b. Brussels: daughter of Emperor Maximilian and Mary of Burgundy. When two years old she was betrothed by treaty to the dauphin of France, afterward Charles VIII., but the contract was never carried out; when 15 years old she was similarly betrothed to the infante John of Aragon, heir to the Spanish throne, who married her two years afterward, and left her a widow within a year; and 1501 she married Philibert II. of Savoy, who died 1504. In 1506 her father appointed her regent of the Netherlands, and charged her with the care and education of his grandson, the future Charles V. of Germany, and his sister Mary. She ruled with great wisdom; conducted the political affairs of the kingdom with firmness and discretion; and rendered the country lasting service by stimulating its material development and progress. She was a plenipotentiary at Cambrai, 1508; made a treaty with Cardinal Amboise; induced the king of England to join the alliance against France 1515; and with Louisa of Savoy, mother of the king of France, negotiated the 'ladies' peace' between Francis I. and Charles V. 1529.

MAR'GARET OF AUSTRIA, Duchess of Parma, and Regent of the Netherlands: 1522-86 (regent 1559–67); b. Brussels: natural daughter of Charles V. by Margaret van Gheenst, a Flemish lady. She was educated at the court of the queen-dowager of Hungary; married first Alessandro, Duke of Florence (1536), who was assassinated within a year, and then Ottavio Farnese, Duke of Parma and Piacenza (1542), by whom she became mother of the celebrated soldier, Alexander Farnese. She was appointed regent of the Netherlands by her brother Philip II. of Spain on his departure for the peninsula, 1559, holding the office 8 years. She was exceedingly masculine in appearance, cultivated a mustache, delighted to dress in man's costume, and rode on horseback man-fashion. Her rule was troublesome and unsatisfactory to herself as well as to the Dutch; yet she resigned power to the Duke of Alva 1567 with great reluctance. She retired to Italy with a large pension from the king, and lived to see her son appointed to the govt. that she had formerly held.

MAR'GARET, SAINT: the queen of Malcolm Canmore (q.v.).

MARGARIC, a. *mär-găr'ĭk* [L. *margarītă;* Gr. *margarītēs*, a pearl]: pertaining to pearls, or the pearl-like substance called *margarine;* applied to an important and widely distributed fatty acid. MARGARIC ACID ($C_{17}H_{34}O_2$), one of the solid fatty acids. At an ordinary temperature, it is solid, white, and crystalline; it is perfectly insoluble in water, dissolves in boiling alcohol, from which it separates in glistening groups of very delicate needles, and is readily soluble in ether. It unites with bases, forming margarates, and in combination with

Glycerine (q.v.) forms the glyceride or fat known as *margarine.* This acid occurs either in a free state or in combination with alkalies in most of the animal fluids, with the exception of urine, and as a glyceride it is widely diffused in the animal and vegetable fats. Heintz maintains that this acid is merely a mixture of about ten parts of Palmitic Acid (q.v.) with one part of Stearic Acid (q.v.). MARGARATE, n. *mâr'gă-rāt,* a compound of margaric acid with a base. MARGARINE, n. *mâr'gă-rĭn,* the pearly solid portion of oils and fats, e.g., human fat, goose-grease, olive-oil, etc., and obtained from them when exposed to cold (see OLEO-MARGARINE). MARGARITE, n. *rīt,* one of the mica family—called also *pearl mica, corundellite,* and *clingmanite,* a pearly-gray mineral. MARGARONE, n. *mâr'gă-rōn,* a solid white fatty matter obtained from *margaric acid.*

MARGARITA, *mâr-gâ-rē'tâ:* Venezuela, an island off the n.e. coast, in the Caribbean Sea, about 30 m. n. of Cumana. In 1901 it was made a province and is known by the name of Nueva Esparta. Its area is 450 sq.m. This island was discovered by Columbus in 1498. The name Margarita, meaning 'pearl,' was given to it because of the valuable pearl fisheries once found in its surrounding waters. The surface is broken by two mountain chains, the highest point of one is nearly 4,000 ft. Near the centre is a lagoon, surrounded by low land. Much of the soil is fertile, but the chief industries are fishing, preparing salt for market, and cattle-raising. The capital is Asunción. Pop. 40,500.

MAR'GARITE, or PEARL MICA: a native hydrous silicate of aluminum and calcium, having the formula $H_2CaAl_4Si_2O_{12}$, and usually occurring in laminated forms, like mica. Its crystals, when they occur, belong to the monoclinic system. Margarite is translucent or sub-translucent, with a vitreous or pearly lustre. It occurs in various colors, but predominantly in gray, with perhaps a reddish tint. It has a hardness of from 3.5 to 4.5, and a specific gravity of about 3. Margarite usually occurs in connection with emery or corundum.

MARGAY, *mâr'gā* (*Felis tigrina*): species of cat or tiger-cat; native of the forests of Brazil and Guiana; of about the size of the wild cat of Europe; of pale fawn color, with black bands on the fore-parts, and leopard-like spots on the hind-parts, and on the rather long thick bushy tail. It is capable of complete domestication, and of being made very useful in rat-killing.

MARGIN, n. *mâr'jin* [L. *margo* or *margĭnem,* brink, border: It. *margine:* F. *marge*]: the border, brink, edge, or verge of anything; the blank edge of a leaf or page; what is written or printed, on the margin; the difference between the price of purchase and sale of an article, out of which the trader derives his profit; something left

or provided for meeting casualties; in *bot.*, the boundary line or contour of a body traced by the union of opposite plane surfaces; latitude, as, this must be taken with a wide *margin:* V. to furnish with a margin; to enter in the margin of a page. MAR'GINING, imp. MAR'GINED, pp. *-jĭnd.* MAR'GINAL, a. *jĭn-ăl* [F.—L.]: pert. to or placed in the margin; placed upon or attached to the edge of anything. MAR'GINALLY, ad. *-lĭ.* MAR'GINATE, a. *-jĭn-āt,* or MAR'GINATED, a. *-ā-tĕd,* having a prominent and well-defined margin. SYN. of 'margin, n.': brim; rim; latitude.

MARGINAL CREDIT: business operation, in which a banker lends the credit of his name to his customers, thus enabling them to carry out important commercial transactions. A merchant in this country, for instance, desires to import tea or silk, but his name is not so well known on the Chinese Exchanges that bills drawn upon him by a merchant in China can be sold there at a reasonable rate of exchange. The tea or silk cannot be bought without the money being on the spot to buy it with, and if he sends out specie for that purpose he involves himself in heavy charges for freight and insurance, and loses the interest of his money while on the voyage. Before it arrives, the prices of tea and silk may have been so altered in the market that he would not be inclined to buy, and his money would thus be placed where it is not wanted. But while drafts by the merchant in China on the merchant in this country would not sell, or would sell only at a heavy sacrifice, the drafts by the merchant in China on a banker in this country will sell at the best price. The merchant in this country therefore deposits with his banker cash or securities equal to the amount to which he desires to use the banker's name, and receives from him *Marginal Credits* for the amount. These are bill-forms drawn upon the banker, but neither dated nor signed, with a margin containing an obligation by him to accept the bills when presented. The bills are dated, drawn, and indorsed by the merchant in China before being sold, so that the obligation runs from the date on which the money was actually paid, and the tea or silk is likely to be in the merchant's warehouse before the bill is payable. For the transaction the banker charges the merchant a commission to remunerate himself for the risk.

Many other transactions of various forms between merchants abroad and in this country are intrinsically the same as when Marginal Credits are used. Bankers accept bills to a great amount for the exchange operations of foreign banks. A banker in, say Canton, buys from his customers bills drawn upon merchants in this country for a given amount, and sends them to his correspondent here, who holds them for him and grants a credit in his favor on the security of them. The Canton banker operates upon this credit by drawing upon the banker here, and sells his drafts at the most favorable exchange: with the money received he purchases other bills, and remits them also, to be again drawn against.

When these operations are made with caution and sound judgment, they are beneficial to all concerned; but when engaged in without sufficient knowledge or recklessly they involve disastrous consequences.

MARGINALIA, n. plu. *mâr-jĭn-a'lĭ-a:* notes written on the margins of books.

MARGRAVE, n. *mâr'grāv* [F. *margrave*—from Ger. *markgraf*, count of the *march*—from *mark*, boundary; *graf*, count]: German title of nobility (see MARQUIS). MAR'GRAVINE, n. fem. *-vēn*, the wife of a margrave.

MARGUERITE DE VALOIS, *mâr-grēt' dĕh vâl-wâ'* (in her youth known as MARGUERITE D'ANGOULÊME, which indeed is strictly her proper designation): 1492, Apr. 12—1549, Dec. 21; b. Angoulême; dau. of Charles d'Orleans, Comte d'Angoulême, and sister of Francis I. of France. She received a brilliant, and even profound education, but was characterized by the most charming vivacity. In 1509, she was married to Charles, Duke of Alençon (whence she is called sometimes M. d'Alençon), who died 1525. In 1527, she was married to Henry d'Albret, King of Navarre (whence she is called sometimes M. de Navarre), to whom she bore a daughter, Jeanne d'Albret, mother of the great French monarch, Henri IV. She encouraged agriculture, the arts, and learning, and to a certain extent favored the Reformation. Later, she found it necessary to be prudent, and even to return in some degree to the practices of the Rom. Cath. Church. But she never ceased to act with a courageous generosity towards the Reformers, who always found an asylum and welcome in Navarre. She seems to have been inclined more to a mystic pietism than to dogmatic Protestantism. She was a zealous patroness of learning, and had great strength of mind and amiability of character. She wrote a little religious work, *Miroir de l'âme pécheresse*, which was condemned by the Sorbonne, as favoring Prot. doctrines. She wrote also poems and tales, and a *Heptaméron des Nouvelles* (Par. 1559), modelled on the *Decameron* of Boccaccio.—Another MARGUERITE (1553-1615), properly called M. de Valois, was great-niece of M. d'Angoulême, being daughter of Henry II. by Catharine de' Medici. She became wife of Henry II., and was famous for beauty, learning, and looseness of conduct.

MARIA CHRISTINA, *mâ-rē'a krĭs-tē'na*, Queen of Spain: 1806, Apr. 27—1878, Aug. (regent 1833-40): daughter of Francis I., King of the Two Sicilies. In 1829, she became fourth wife of Ferdinand VII. of Spain; who, 1830, restored the law by which, in default of male issue, the right of inheritance was given to females, and in Oct. of that year the queen gave birth to a daughter, Isabella II., ex-queen of Spain. The Spanish liberals gladly embraced the cause of the queen, rejoicing to see the dreaded Don Carlos, Ferdinand's brother, further removed from probable succession to the throne. Ferdinand died, 1833, Sep. 29, and by his testament his

widow was appointed guardian of her children—the young Queen Isabella, and the Infanta Maria Louisa, now Duchess de Montpensier—and regent, till the young queen should attain the age of 18 years. A civil war broke out, the adherents of Don Carlos seeking to place him on the throne. The event of this war, which continued till 1840, was long doubtful, and Spain was fearfully desolated by contending armies; but the queen-mother seemed indifferent to everything except the company of Don Fernando Muñoz, one of the royal body-guard, whom she made her chamberlain, and with whom she was united, 1833, Dec., in a morganatic marriage which was kept secret, while her connection with him was no secret. She had ten children by him. A conspiracy, which broke out, 1836, Aug. 13, exposed Muñoz to great danger, and led the queen-mother to concede a constitution to Spain. Her practice as regent was to adopt the course agreeable to the minister of the day, and thus her government was despotic under one ministry and liberal under another. She contrived, however, on many occasions to embarrass the proceedings of her more liberal or constitutional ministers; but when she sanctioned by her signature the law respecting the Ayuntamientos (q.v.), a popular commotion ensued, and she gave to the new prime minister Espartero (q.v.), 1840, Oct. 10, a renunciation of the regency, and retired to France, but continued to interfere from her retirement in the affairs of Spain. After the fall of Espartero, she returned to Madrid 1843, and 1844, Oct., her marriage with Muñoz, then made Duke of Rianzares, was publicly solemnized. Her participation in the schemes of Louis Philippe as to the marriage of her daughters, 1846, and the continual exercise of all her influence against constitutional liberty, made her the object of great dislike to the whole liberal party in Spain. At length, 1854, July, a revolution expelled her from the country, and she again took refuge in France, returning to Spain 1864, and again retiring 1868.

MARIA LOUISA, *ma-rī'a tô-ē'za:* Regent of the French empire, second wife of Emperor Napoleon I., 1791, Mar. 12—1847, Dec. 18 (regent 1813–4); daughter of Emperor Francis I. of Austria. She was married to Napoleon, after his divorce of Josephine, 1810, Apr. 2. The marriage seemed to give stability to the Bonaparte dynasty, and to afford some prospect of peace to Europe. 1811, Mar. 20, she bore a son, who was called King of Rome. At the beginning of the campaign of 1813, Napoleon appointed her regent in his absence, but under many limitations. On the abdication of Napoleon, 1814, she went to Orleans, and thence, in company with Prince Esterhazy, to Rambouillet. She was not permitted to follow her husband, but went with her son to Schönbrunn, where she remained till, 1816, she received the duchies of Parma, Piacenza, and Guastalla, and entered on their government. She contracted a morganatic marriage with Count von Neipperg. She died at Vienna.

MARIAN, a. *mâr'ĭ-an:* pertaining or relating to the Virgin Mary; or to Mary, Queen of England, daughter of Henry VIII., e.g., the Marian persecution.

MARIANA, *mâ-rē-â'nâ*, JUAN DE: Spanish historian and scholar: 1536–1624, Feb. 17; b. Talavera de la Reina; of humble parentage. In 1554 he entered the rising order of the Jesuits. His early studies, both in languages and in theology, were so brilliant that he was appointed to teach in the Jesuit schools, first at Rome (where the celebrated Bellarmine was one of his scholars) 1561, in Sicily 1565, and in Paris 1569. After seven years in Paris his health compelled his return to his native country, and he settled at Toledo, where he resided till his death. His retirement did not prevent his energetic and sustained literary activity. Of his History of Spain, he published 20 books 1592, and 10 additional books 1605, bringing the narrative to 1516. The original was in Latin, the elegancy and purity of which have secured for M. a place among the most distinguished modern Latinists. Its great historical merit also is admitted, though with some drawbacks, even by such writers as Bayle. M. himself published a Spanish translation, still one of the classics of the language. The most celebrated of M.'s many works is his well-known treatise, *De Rege et Regis Institutione* (1599), in which is raised the question, Whether it be lawful to overthrow a tyrant? M. decides that it is—even where the tyrant is not a usurper but a lawful king: see JESUITS. The principles of the book, in other particulars, are in the main the same as those of all modern constitutional writers. The tyrannicide doctrines of this writer drew much odium on the entire order of Jesuits; but it should be noted, that while, on the one hand, precisely the same doctrines were taught in almost the same words by several Prot. contemporaries of M. (see Hallam's *Literary History*, III. 130–140); on the other, M.'s book itself was formally condemned by the general Acquaviva, and the doctrine forbidden to be taught by members of the order.

MARIANNA, *mâ-re-ân'nâ:* episcopal city of Brazil, province of Minas-Geraes. In the neighborhood are gold, silver, and lead mines. Pop. 8,000.

MARIANNE' ISLES: see LADRONES.

MARIA THERESA, *ma-rī'a tė-rē'sâ*, Empress of Germany, and Queen of Hungary and Bohemia: 1717, May 13—1780, Nov. 29; b. Vienna (queen 1740–80, empress 1765–80); daughter of Emperor Karl VI. By the Pragmatic Sanction (q.v.), her father appointed her heir to his hereditary thrones. In 1736, she married Francis Stephen, Grand Duke of Tuscany, to whom she gave an equal share in the government when she became Queen of Hungary and of Bohemia, and Archduchess of Austria, on the death of her father, 1740, Oct. 21. She found the monarchy exhausted, the finances embarrassed, the people discontented, and the army weak; while Prussia, Bavaria, Saxony, Naples, and Sardinia, stirred

up by France, put forward claims to portions of her dominions founded chiefly on the extinction of the male line of the House of Hapsburg. Frederick II. of Prussia soon made himself master of Silesia; Spain and Naples laid hands on the Austrian dominions in Italy; and the French, Bavarians, and Saxons conquered some of the hereditary Austrian territories. The young queen was in utmost danger of losing all her possessions, but was saved by the chivalrous fidelity of the Hungarians, the assistance of Britain, and most of all by her own resolute spirit. Her enemies also quarrelled among themselves; and the War of the Austrian Succession, after lasting more than seven years, terminated in her favor by the peace of Aix-la-Chapelle, 1748. She lost only Silesia and Glatz, and the duchies of Parma, Piacenza, and Guastalla, while, on the other hand, her husband was elected emperor. During the time of peace, she made great financial reforms; agriculture, manufactures, and commerce flourished, the national revenues greatly increased, and the burdens were diminished. The empress availed herself of the increase of the revenue for increase of her military power. She held the reins of government herself, but was much guided by her husband and her ministers. She found at last in Kaunitz (q.v.) a minister with the wisdom and energy requisite for the conduct of affairs, and in him she placed almost unlimited confidence. The *Seven Years' War* (q.v.) between Austria and Prussia again reduced Austria to exhaustion; but when it was concluded, the empress renewed her efforts to promote the national prosperity, and made many important reforms, ameliorating the condition of the peasantry, and mitigating the penal code. Her son Joseph was elected king of the Romans, 1764; and on the death of her husband, 1765, she associated her son with herself in the government of her hereditary states, but in reality committed to him the charge only of military affairs. She joined with Russia and Prussia in the partition of a third part of Poland (1772), after the death of Augustus III., though she at first objected to the proposed spoliation, and thought it necessary to satisfy her conscience by obtaining the approval of the pope. Galicia and Londomeria were added to her dominions at this time. She also compelled the Porte to give up Bukowina to her (1777). The brief Bavarian war of succession ended in her acquisition of the Innthal, but led to the formation of the *Fürstenbund* or *League of German Princes*, which set bounds to the Austrian power in Germany. Throughout her reign, she evinced a resolute and masculine character, and raised Austria from deep depression to a height of power such as it had never previously attained. Although a zealous Rom. Catholic, she maintained the rights of her crown against the court of Rome, and endeavored to correct some of the worst abuses in the church. She prohibited the presence of priests at the making of wills, abolished the right of asylum in churches and convents, suppressed the Inquisition in Milan, and, 1773, the order

of Jesuits. She also forbade that any person, male or female, should take monastic vows before the age of 25 years. She did nothing, however, to ameliorate the condition of the Protestants in her dominions. She had three sons and six daughters; among the latter was Queen Marie Antoinette (q.v.). Her eldest son Joseph II., succeeded her.

MARIAZELL, *mâ-rē-â-tsĕl:* most famous place of pilgrimage in Austria, on the n. border of the crownland of Styria, 24 m. n. of Bruck. It consists of a number of inns, or lodging-houses, and is visited by 100,000 pilgrims annually. Here there is a wooden image of the Virgin, about 18 inches high, believed to possess the power of working miracles. During the great annual procession from Vienna, the greater number of pilgrims of both sexes spend the night in the woods in drinking, singing, and general riot. Formerly, the processions from Gratz and Vienna took place at the same time, but, owing to the fighting, as well as debauchery, that characterized the occasions, the processions were assigned to different times. Pop. 1,100.

MARICOPAS: see COCO-MARICOPAS.

MARIE DE' MEDICI, *mâ-rē' dā mĕd'e-chē*, Queen of France, wife of Henri IV.: 1573, Apr. 26—1642, July 3 (regent 1610–17); b. Florence; daughter of Francis I., Grand Duke of Tuscany. She was married to Henri 1600, Dec. 16; and in Sep. following gave birth to a son, afterward Louis XIII. The union was not happy. M. was an obstinate, passionate, waspish, and withal dull-headed woman, and her quarrels with the king soon became the talk of Paris. She was—as such women are apt to be—wholly under the influence of favorites. Leonora Galigaï and Concini, who professed to be a married pair, exercised a disastrous influence over her mind, and encouraged her dislike to her husband. The assassination of Henri (1610, May 14) did not much grieve her, and she was even suspected of complicity in the act, though nothing was ever ascertained that could incriminate her. For the next seven years she governed as regent, but proved as worthless a ruler as she had been a wife. After the death of Concini, a sort of revolution took place. Her son, Louis XIII., assumed royal power. M. was confined to her own house, and her son refused to see her. Her partisans tried to bring about a civil war, but their attempts were futile; and by the advice of Richelieu, then Bp. of Luçon, she made her submission to her son 1619, and took her place at court. M. hoped to win over Richelieu to her party, but she did not in the least comprehend that mighty genius; however, she soon found that he had no mind to be ruled by her, whereupon she resolved, if possible, to undermine his influence with the king. Her intrigues for this purpose failed; she was imprisoned in Compiègne, whence she escaped, and fled to Brussels 1631. Her last years were spent in utter destitution, and she is said to have died in a hay-loft at Cologne.

MARIE AMELIE, *mâ-rē′ â-mā-lē′* DE BOURBON: Queen of the French, wife of King Louis Philippe: 1782–1866; b. Sicily; daughter of Ferdinand IV., King of Naples, afterward Ferdinand I., King of the Two Sicilies. She was educated by private tutors in Sicily, Naples, and Venice; married Louis Philippe, then Duke of Orleans, and exiled from France, 1809, Nov. 25; and from the time of her husband's election as king (1830) till his dethronement (1848) she avoided political concerns, and applied herself with great faithfulness to domestic duties and the zealous promotion of public charities. After the dethronement, she joined her husband at Claremont, the palace of the king of the Belgians, near London, where both passed the remainder of their lives. She was the mother of five sons and three daughters, the eldest son, Duke d'Orleans, died 1842; the eldest daughter 1839; and the fifth son, Duke de Montpensier, 1890. The other sons are the Duke de Nemours, Duke d'Aumale, and Prince de Joinville; and daughters Louise, subsequently queen of the Belgians; and Clementine, wife of the Prince of Saxe-Coburg.

MARIE ANTOINETTE, *mâ-rē′ ŏng-twâ-nĕt′* DE LORRAINE, JOSEPHE JEANNE, Queen of France, wife of Louis XVI: 1755, Nov. 2—1793, Oct. 16; b. Vienna; youngest daughter of Francis I., Emperor of Germany, and of the famous Maria Theresa (q.v.). M. A., at the age of 14, was betrothed to the Dauphin; and in the following year was married at Versailles. Her reception by her husband and the king, Louis XV., was flattering; but her Austrian frankness and simplicity, her naïveté, unceremonious pleasantry, and detestation of rigid etiquette, scandalized Versailles. Soon after the accession of Louis XVI., 1774, May, which made her queen at 19 years of age, libels were circulated by her enemies, accusing her of constant intrigues, not one of which has ever been proved. Her faults, as a queen (and, in that age which was rapidly growing earnest, angry, and imbittered, they were fatal faults), were natural levity, girlish love of pleasure, of great banquets, and of extravagant display in dress, aristocratic indifference to general opinion—consistent with the absolutist notions of her empress-mother, Maria Theresa, reckless favoritism for unworthy friends, and lamentable incapacity to see the actual misery of the great masses of the French nation. The poor queen's whole social life was a mistake. Her careless intimacy with the most dissipated society, her night visits to masked balls, did not fail to lower her in public esteem, though there is absolutely no good evidence of any personal immoralities on her part. The affair of the *diamond necklace* (q.v.), 1785, hopelessly compromised her good name in the eye of the public, though, in fact, M. A. was innocent of any grave offense. Her political rôle was not more fortunate. She was from the first distrusted as only an Austrian spy in exalted station: probably indeed she was Austrian at heart; and probably her mother sought to use her in the interest of some

MARIE ANTOINETTE LED TO EXECUTION.

of her plans for Austria; but there is no evidence of any consistent line of policy adopted by M. A. in that interest. Loménie de Brienne and Calonne were ministers of her choice, and she shared the opprobrium which came upon them for their reckless squandering of the national finances. She strongly opposed the assembly of the notables, and in the following year, of the states-general; and, indeed, she had good reason to dread their convocation, for one of the first acts of the Notables was to declare the queen the cause of the derangement of the finances. From the first hour of the Revolution, she was an object of fanatical hatred to the mob of Paris. Her life was attempted at Versailles by a band of assassins 1789, Oct. 6, and she narrowly escaped. After this, she made some spasmodic efforts to gain the good-will of the populace by visiting the great manufactories of the capital, such as the Gobelins, and by seeming to take an interest in the labors of the workmen, but the time was gone by for such transparent show to succeed. The relentless populace only hated her the more. Much of the fatal vacillation of the king's policy was due to her influence. She had far the strongest will of the two: she was obstinate, and never ready to hear advice or take warning. Louis saw the need of concession and of actual reform; and, if left to himself, would doubtless have entered on a policy which, even though it might not have saved his throne, would have precluded the frightful features of the catastrophe which was swiftly drawing near. M. A. refused the advice of those who were at first the more moderate leaders of the popular movement, and who counselled compromise, looking toward establishing a constitutional government: the queen would not abate her claims, nor trust any of those who dared avow any sympathy with the rights of the people. The king was strong enough to refrain from fully adopting her policy, but not strong enough to carry out, against her influence, a policy of justice and of wisdom to which he was inclined. At last, after long refusal, she resolved on flight. Her husband hesitated to abandon his country, and she would not go without him. A dim sense of kingly duty and honor was not lacking in the well-meaning and good-natured Louis, but after the mob stopped his coach 1791, Apr. 18, and would not let him go to St. Cloud, he consented to flight on the night of June 20. Unfortunately, the royal fugitives were recognized and captured at Varennes. From this time M. A.'s attitude became heroic; but the French people could not rid themselves of the suspicion that she was secretly plotting with the allies for the invasion of the country. After the useless effort to defend the Tuileries, 1792, Aug 10, she was confined in the Temple. Separated from her family and friends, she was removed to the Conciergerie, by order of the convention; condemned after mock trial by the Revolutionary Tribunal (Oct. 15), and guillotined next day. See *Mémoires sur la vie privée de Marie Antoinette*, by Mme. Campan (1823); Feuillet de Conches, *Louis XVI., Marie Antoinette et Mme.*

Elisabeth (1864-73); D'Arneth, *Correspondance secrète entre Marie Thérèse et le Comte Mercy d'Argenteau, avec des lettres de Marie Thérèse et Marie Antoinette* (2d ed., 1875); and Yonge, *Life of Marie Antoinette* (1876).

MARIE GALANTE, *mâ-rē' gâ-lŏngt':* island in the W. Indies, one of the Lesser Antilles, 17 m. s.e. of Guadeloupe, about 60 sq.m., mostly covered by forests, and surrounded by steep, rocky shores. It belongs to France. The cultivated parts produce sugar, coffee, and cotton. Cattle and horses are numerous, the latter of esteemed breed. Its chief town is Grandbourg, or Marigot, on the s.w. coast. Marie Galante is named from the ship commanded by Columbus when he discovered the island, 1493. Pop. 15,000.

MARIENBAD, *mâ-rē'ĕn-bât:* one of the most frequented of European spas, 33 m. n.w. of Pilsen, about 18 m. s. of Carlsbad, almost 2,000 ft. above sea level. The springs of Marienbad have long been used by the people of the vicinity, but since 1857 it has become a resort for persons from distant parts of the world. The springs are numerous, varying in temperature from 48° to 54° Fahrenheit. They are saline, containing sulphate of soda and various alkaline ingredients, but differing considerably in composition and qualities. In general they resemble those of Carlsbad, except that they are cold and have twice the quantity of purgative salts They are used both internally and in the form of baths. Great quantities of the waters of some of the springs, about a million bottles annually, are exported to distant places. Marienbad is a picturesque and charming place, surrounded by wooded heights, and is visited every season by 12,000 or 13,000 people. Pop. 4,500.

MARIETTA, *mā-rĭ-ĕt'a:* city, county seat of Cobb co., Ga.; on the Nashville, Chattanooga & St. Louis Railroad; about 20 m. n. by w. of Atlanta. Kenesaw Mountain is west of the city. It was settled about 1840-1 and incorporated in 1852. A city charter was granted in 1885. It is in a fertile agricultural region in which stock-raising is one of the prominent occupations. Large marble quarries are in the vicinity. The chief manufactures are chairs, dressed marble, and machine-shop products. The chief buildings are the churches and schools. The Clarke Library, which contains about 6,000 volumes, is in Marietta. A national cemetery located here contains the graves of 10,279 soldiers; the unknown dead number 2,967. The mayor and council are chosen at a popular election. Pop. (1910) 5,949.

Marietta was an intermediate objective point in Gen. Sherman's campaign for Atlanta, and when he crossed the Etowah, 1864, May 23, his columns were headed for that place by way of Dallas and New Hope Church, but Gen. J. E. Johnston threw his army in his front and checked him at New Hope Church and Dallas. After

many hard-fought battles and constant severe skirmishing, Johnston abandoned his Dallas lines on June 4 and took position covering Marietta, his left on Lost Mountain, his right beyond the railroad and behind Noonday Creek, with a strong advanced position on Pine Mountain. Sherman repaired the railroad, established a secondary, fortified base at Allatoona Pass, and joined by Blair's 17th corps, advanced June 10 and confronted Johnston in his new and strong position, and by the 14th was strongly intrenched before it in a continuous line of 10 m. Johnston abandoned Pine Mountain on the night of the 14th, and Sherman advanced his lines, bringing on the engagement at Pine Mountain June 15. The general movement was continued on the 16th and the right thrown forward to threaten the railroad below Marietta. On the 18th Johnston fell back to a new line, including Kenesaw Mountain, which was strongly fortified, and Sherman pressed in closely on the centre and left, n. of Marietta, still continuing the extension of his line to the right, s. of it. Johnston, making a corresponding movement by his left, encountered Sherman's right at Kolb's Farm on the 22d. Sherman assaulted Kenesaw Mountain on the 27th, and was repulsed. Flanking operations were then renewed to the right to reach the railroad, and Johnston, finding it in danger and his communications with Atlanta threatened, after being 26 days under an uninterrupted cannonade and infantry fire, abandoned Marietta on the night of July 2 and fell back to a new line, previously selected and intrenched, 10 m. s. of Marietta, and covering the railroad and his pontoon bridges across the Chattahoochee, with an advanced position at Smyrna Campground. Sherman occupied Marietta on the morning of July 3. The Union loss in the operations around Marietta was 1,790 killed and missing, and 5,740 wounded, an aggregate of 7,530. Johnston reported a Confederate loss of 468 killed and 3,480 wounded. Consult: *Official Records*, Vol. XXXVIII.; Sherman, *Memoirs*, Vol. II.; Van Horne, *History of the Army of the Cumberland*, Vol. II.; Johnston, *Narrative*.

MARIETTA: city, county seat of Washington co., Ohio; on the Ohio River at the mouth of the Muskingum, and on the Cleveland & Marietta, the Toledo & Ohio Central extension, the Baltimore & Ohio Southwestern, the Zanesville & Ohio, and the Columbus Northern railroads; about 95 m., in direct line, s.e. of Columbus, the capital of the state. The first settlement was made in 1788 by people from New England, under Gen. Rufus Putnam, acting for the 'Ohio Company' (q.v.) which had secured a grant of lands on both sides of the Muskingum River. The place was named in honor of Marie Antoinette. Arthur St. Clair organized here 1788, July, the Northwest Territory (q.v.). In 1800 Marietta was incorporated as a town. Fort Harmar, built in 1785;

was opposite Marietta, and in 1890 the village of Harmar, once the site of the fort, was annexed to the city. The building used as the land office for the 'Ohio Company' and an old church, the oldest in the state, are still standing here and in good condition. Many of the pioneers of New England, as well as of Ohio, and many of the Revolutionary soldiers, were buried in the Marietta cemetery.

The city is in a coal, iron, petroleum, and gas region, with fertile agricultural lands in the valleys. Some of the manufacturing establishments are the chair factory, employing 650 persons; glassworks, employing 200; tool shops, with 150 employes; brick plant, 300 employes; boat yards, 75; foundries, 300; other manufactories having in all fully 300 more employes. There are five banks with a combined capital of $500,000; the annual business amounts to over $3,000,000. The principal buildings are the Marietta College (q.v.), public and parish schools, the churches, and the county buildings. The government is vested in a mayor and council and is administered according to the 'Ohio Municipal Code.' The council is composed of six members, two of whom are elected each year. The site of Marietta was once part of a remarkable group of ancient works which consisted of two sections, one containing about 40 acres, the other about 20 acres. The remains of mounds, truncated pyramids, walks, walls, and other ancient works still exist, although the city covers a large part of the original enclosures. Remains of the walls, about 5 or 6 ft. high by 20 or 30 ft. base, may still be seen. Pop. (1910) 12,923. Consult: King, *History of Ohio;* Hoar, *Oration at the Celebration of the Centennial of the Founding of the Northwest at Marietta.*

MARIETTA COLLEGE: in Marietta, Ohio, founded in 1835 for men and women. It has college and preparatory departments, the latter is known as Marietta Academy. The courses lead to the degrees of A.B., PH.B., and B.L. Courses are provided for work in music, art, and military science, and short summer schools are given for work in the arts and sciences. The library, which has about 61,000 volumes and 30,000 pamphlets, is noted for its books on the history of the Northwest. In 1907 there were connected with the college 30 instructors and about 495 students. The grounds and buildings were valued at $251,000, the productive funds at $266,000, and the total income $22,500.

MARIETTE, *mâ-re-ĕt'*, AUGUSTE EDOUARD (MARIETTE PASHA): 1821, Feb. 11—1881, Jan. 19; b. Boulogne, France. He was educated at the college there, in which afterward he became professor; and while so engaged first became interested in archæology, and published *Lettres à M. Bouillet* (Paris, 1847), an essay on the history of Boulogne. In 1848 he received a position in the Egyptian museum of the Louvre; and 1850 was sent by

the government to gather Coptic MSS. in Egypt. His excavations and discoveries in connection with his search for the true site of Memphis led to the finding of many important remains, such as the Serapeum, the first Memphian temple discovered, near the three great pyramids. Beginning to dig 4 m. w. of the accepted site of Memphis, Mariette came first upon an avenue of sphinxes, which led directly up to the magnificent granite and alabaster temple of Serapis mentioned by Strabo, which contained the sarcophagi of the sacred bulls of Apis from the 19th dynasty to the Roman supremacy. Besides these he found no less than 2,000 sphinxes, and over 4,000 statues, bas-reliefs, and inscriptions, some evidently of Greek construction; and various streets, colonnades, and other structures belonging to a great city. His excavations around the base of the sphinx near Gizeh not only disclosed the entrance to it, but proved it to be sculptured out of the solid rock. In 1854 he returned to Paris and was made conservator of the Egyptian museum in the Louvre; and 1855 was sent to Berlin to study Egyptian remains in the museums there. On his return to Egypt, 1858, the viceroy made him conservator of the monuments and antiquities of the land, with the title of bey (later promoted to pasha), with an annual appropriation for the prosecution of his researches, and the foundation and maintenance of the museum of Boulak. His discoveries at Tanis revealed the monuments of the Hyksos dynasty, and those at Thebes explain the chronology of the various dynasties. In 1860 he made the important discovery of the mummy of queen Aahhotep, of the 18th dynasty, with a wealth of jewels of exquisite workmanship belonging to her. In 1873 the Institute of France awarded him the biennial prize of 20,000 francs. His discoveries have been of utmost importance for the light that they have thrown upon the earliest periods of Egyptian history. His chief published works are *Mémoire sur la mère d'Apis* (1856); *Aperçu de l'Histoire d'Egypte* (1864); *Nouvelle table d'Abydos* (1856), account of a second tablet found in Abydos which supplies the vacancies of the first and gives a list of the kings of the first 6 dynasties, corroborating that of Manetho; *Le Sérapéum de Memphis* (with 110 plates, 1857-64); *Fouilles exécutées en Egypte, en Nubia, et au Soudan d'après les ordres du vice-roi d'Egypte* (1867); *Notice des principaux monuments du musée de Boulak* (1870); *Les Papyrus égyptiens du musée de Boulak* (1871); *Album du musée de Boulak* (with 600 photographic plates, 1873); and *Les Mastabas de l'Ancien Empire*, published after his death. He died at Cairo and lies buried in the museum-garden at Boulak, inclosed in an ancient Egyptian sarcophagus.

MARIGNA'NO. See MELEGNANO.

MARIGOLD, n. *măr'ĭ-gōld* [the Virgin *Mary*, and *gold*]: a common garden plant (see below). MARIGOLD-

WINDOW, a circular cathedral window—called also a CATHARINE-WHEEL WINDOW.

MAR'IGOLD: name given to garden plants of nat. ord. *Compositæ*, sub-ord. *Corymbiferæ*, chiefly of the genera *Calendula* and *Tagetes*. The genus *Calendula* has the achenia remarkably curved, variously toothed, and very rough on the back. The species are annual and perennial herbaceous plants and shrubs, of which some of the former are found in the countries bordering on the Mediterranean, the latter chiefly in S. Africa.—Pot marigold (*C. officinalis*) is an annual, native of France and southern Europe, with an erect stem, 1 to 2 ft. high, the lower leaves obovate on long stalk, and large, deep yellow flowers. It has long been common in gardens, and there are varieties with double flowers. The whole plant has a slight aromatic odor, and bitter taste, and was formerly in repute as a carminative, also as an aperient and sudorific. The florets were the part used, and they were dried in autumn, to be preserved for use. They are often employed to adulterate saffron, and sometimes for coloring cheese. They were formerly a frequent ingredient in soups, and are still so used in parts of England. The genus *Tagetes* consists of annual and perennial herbaceous plants, natives of the warmer parts of America, although *T. erecta*, frequently cultivated in Britain, bears the name AFRICAN MARIGOLD; and *T. patula*, another annual well known in flower borders, is called FRENCH MARIGOLD. Both species are Mexican. They have been long in cultivation, and are admired for the brilliancy of their flowers.—CORN MARIGOLD is a *Chrysanthemum* (q.v.)—MARSH MARIGOLD (q.v.) has no botanical affinity with the true marigolds.

MARIGOT, n. *măr'ĭ-gŏt* [F. *marais*, a marsh]: a small lake close to or near the brink of a river, fed by the overflowing of the river.

MARIGRAPH, n. *măr'ĭ-grăf* [L. *mare*, sea; Gr. *graphō*, I write]: apparatus for registering the height of the tides.

MARINADE, n. *măr'i-nād* [F. pickle—from *marin*, marine]: a liquor compounded of wine and vinegar, with herbs and spices, in which fish or meats are steeped before dressing to improve their flavor.

MARINE, a. *ma-rēn'* [L. *marīnŭs*, belonging to the sea—from *mărĕ*, the sea: It. *marina*, the sea-coast: F. *marin*, marine]: of or pertaining to the sea; near or in view of the sea; representing the sea; naval; maritime; nautical: N. a soldier who serves on shipboard (see MARINES): the navy or collective shipping of a kingdom or state; naval affairs or interests in general. MARINED, a. in *her.*, applied to an animal whose lower part terminates unnaturally like the tail of a fish. MARINER, n. *măr'ĭ-nĕr*, a seaman or sailor. MARINER'S COMPASS, a compass fitted for use on board ship (see

COMPASS). MARINE-ENGINE (see STEAM ENGINE). MARINE-GLUE, a composition of tar and shellac. MARINE-SOAP, a soap chiefly made of cocoa-nut oil, adapted for washing with sea water. MARINE-STORE, in the United States called *junk-shop*, place where old ships' materials, as canvas, iron, junk, are bought and sold; now applied to shops where any old articles, as iron, bottles, grease, are bought and sold: such shops are subjected to restrictions by local laws in order to keep some check on their relations with thieves and other venders of stolen property.

MARINE INSECTS: Insects have not only invaded rivers and lakes, they have established themselves to some extent at least, along the margin of the sea. On a sunny day by the shore myriads of flies may be seen hovering over the seaweed cast up by the tide. These have been developed from grubs which live and feed in the decaying weed, and are able to bear immersion twice daily. Around the rock-pools many midges may be noticed. Their grubs feed on growing green seaweed, and spend their whole life in the salt water, breathing the dissolved air, as do their fresh-water relations, by means of gill filaments, or simply through the surface of the skin. Many species of beetles inhabit the shore, and are submerged twice daily, when they lurk under stones or burrow into the sand; their hairy bodies are not easily wetted, and in one of the best known marine beetles (*Aëpus*) there are paired air sacs in the hind body which are believed to act as reservoirs for breathing while the tide is up. Several kinds of very small springtails may be seen on the surface of the rock-pools at low tide; probably when the water rises they retire into crevices of the rocks. They are covered with a very fine, dense pile, and it seems impossible to wet them.

The absence of wings is a common character among the seashore insects. The beetles of the genus *Aëpus* are wingless, and so is the small bug *Aëpophilus* often found in their company, as well as the female of the midge *Clunio*, whose mate, though winged, appears not to fly, but to use his wings as sails as he skims over the surface of the rock-pools. 'The tendency of insects on oceanic isles to lose their wings has often been noticed,' says Carpenter, 'and the loss of the power of flight explained as an advantage, since insects which do not fly cannot be blown out to sea. Possibly the absence of wings in so many seashore insects can be explained in like manner. Several genera of pond skaters have one or two species which frequent the water of estuaries and harbors; these are in all cases wingless, though their fresh-water relations are, as a rule, winged.'

The extreme of adaptation to marine life is shown by the bugs of the genus *Halobates*, also belonging to the family *Hydrometridæ*, with their short, anchor-like fore-legs and their immensely long and slender middle and

hind-legs, the middle shin and foot being fringed with long hairs. The elongate wingless fore body of these insects and the greatly reduced hind body give them a most peculiar and characteristic appearance, and the dense pile wherewith they are clothed keeps them dry. They have been observed gliding over the calm seas of the tropics, often hundreds of miles from land, or clinging to drifting substances whence they could suck food. Consult: G. H. Carpenter, *Insects, Their Structure and Life* (1899); Miall, *Natural History of Aquatic Insects* (1895).

MARINE INSURANCE. See INSURANCE, MARINE.

MARINES: troops enlisted for service either on board ship or on shore. They are drilled, disciplined, clothed, equipped, and paid similarly to the land forces. Their duties are to maintain the necessary guards, man some of the guns, form part of the armed crews of the various boats when called away for service, and form a permanent force for landing with the seamen if necessary. In all these matters they are commanded by their own officers. The marines of the European continental nations are not designed for service permanently on board ship; the American navy is the only one besides that of Great Britain in which the marine forms a necessary and definite fraction of a ship's company. United States marines, who are designated as the Marine Corps, distinguished themselves greatly in the operations in Cuban waters in 1898 and in those which led to the rescue of the foreign legations in Peking in 1900. The name marines is also used in the expression: 'Tell that to the marines,' signifying utter disbelief in a statement made or story told; it arose from the fact that marines, being ignorant of seamanship, were made butts of by the sailors. See NAVY OF THE UNITED STATES.

MARINETTE, *măr-ĭ-nĕt'*: city, county seat of Marinette co., Wis.; at the mouth of the Menominee River, on Green Bay, and on the Chicago & North-Western, the Wisconsin & Michigan, and the Chicago, Milwaukee & St. Paul railroads; about 50 m. n. by e. of Green Bay and opposite Menominee, Mich. The harbor is large and safe, and the river affords opportunity for bringing logs from the forests along its upper course in both Wisconsin and Michigan. Marinette was settled about 1849-50 and in 1887 was incorporated. The water power is extensive and the lumber industry of Marinette is most important. The large lumber mills are the chief manufacturing establishments of the city. Other industrial establishments are pail factories, paper and pulp mills, box and broom factories, gas and traction engine and iron works, threshing machine factories, furniture factories, and cabinet shops. The city carries on a lake commerce with all the important lake ports. The chief buildings are the city and county buildings, two hospitals, a public library, 20 churches, fine public and

parish school buildings, and Our Lady of Lourdes' Institute. In the vicinity is a large assembly ground where various religious and educational conventions are held each summer. Pop. (1910) 14,610.

MARINI, *mâ-rē'nē*, or MARINO, *mâ-rē'nō*, GIAMBATTISTA: 1569, Oct. 18—1625, Mar. 25; b. Naples: Italian poet. He abandoned jurisprudence for poetry, a decision which led to his expulsion from home. All through life, Marini seems to have courted troubles by his unbridled licentiousness, and many of his best compositions are polluted with shameless obscenity. Marini sojourned successively in Rome, in Turin, and in France, where Marie de' Medici received him with marked favor, and conferred on him a liberal pension. His best work, the *Adone*, was written during his residence in France; and on its publication he revisited his native country (1622), and died at Naples. He is the founder of the *Marinist* school of poetry, of which the essential features are florid hyperbole and false overstrained imagery.

MARI'NO, or SAN MARI'NO. See SAN MARINO.

MARINO, *mâ-rē'nō:* town of central Italy, 12 m. s.e. of Rome, near Lake Albano. Between the hill of Marino and the ridge of Alba Longa is a wooded glen called *Parco di Colonna*, the site of the *Aqua Ferentina*, where the ancient Latin tribes held their general assemblies from the destruction of Alba to B.C. 338. In the middle ages Marino was the stronghold of the Orsini family; in the 15th c. it became the property of the Colonna family, who still retain it. Pop. 6,500.

MARIO, *mâ'rē-ō*, GIUSEPPE, Marquis de Candia: 1810—1883, Dec. 11; b. Turin; of aristocratic family. He evinced from his boyhood high musical abilities. In 1830 he received his commission as officer in the Chasseurs Sardes; but for some youthful escapade was ordered from Genoa to a temporary retreat at Cagliari. There he resigned his commission, and as this was not accepted, he escaped to Paris. The young Sardinian deserter speedily won his way into the best circles of fashionable Paris, both by his genial nature and by the charm of his exquisite voice. Having contracted debts, however, he accepted the appointment of first tenor of the Opera, with a salary of 1,500 francs per month; at the same time he changed his name from Marquis of Candia to Mario. After two years' study at the Conservatoire, Mario made his début, 1838, Dec. 2, in *Robert le Diable*, first of a long series of operatic triumphs. At the Théâtre Italien he took rank with Rubini, Lablache, Malibran, Sontag, and Grisi; and by none of these great artists was he excelled in purity, sweetness, method, and taste. 1845-50 he fulfilled an engagement in Russia, and on his return appeared in London, where his success was immense. Mario's operatic career was a succession of brilliant and remunerative engagements.

MARIOLATRY.

MARIOLATRY, n. *mā′rĭ-ŏl′ă-trĭ* [L. and Gr. *Mariă*, the Virgin Mary: Gr. *latreia*, worship]: a name given by Prot. polemical writers to the worship rendered by Rom. Catholics to the Virgin Mary. MA′RIOL′ATER, n. *-ă-ter*, one who worships the Virgin Mary.—These terms are intended to imply that the Rom. Cath. worship of the Virgin is the supreme worship of *latreia* or adoration, which Rom. Catholics earnestly disclaim, though, from her relation to the Lord Jesus, they hold her worship, which they style *hyperdulia*, to be higher than that of all other saints: see INVOCATION OF SAINTS: MARY, THE BLESSED VIRGIN. Many examples of prayers addressed to Mary, of acts of worship done in her honor, and of expressions employed regarding her, are alleged by controversialists, for the purpose of showing that the worship of Mary in the Roman Church is in effect 'adoration.' Such are (see Farrar's *Ecclesiastical Dictionary*, p. 372) the 'Litany of the Sacred Heart of Mary;' the adaptation of the Athanasian Creed as a profession of faith regarding her; addresses to her as the 'hope of the desponding, and refuge of the destitute;' professions that 'her Son has given her such power that whatever she wills is immediately done;' kneelings and prostrations before her image; pilgrimages in her honor. To these and similar allegations, Rom. Catholics reply, that many of the quoted prayers and devotional practices are entirely unauthorized by the church, and that some of them are undoubtedly liable to misinterpretation; but they further insist that all such prayers, however worded, are to be understood, and are, in fact, understood by Rom. Catholics, even ordinarily acquainted with the principles of their faith, solely as petitions for the intercession of Mary, and as expressions of reliance, not on her own power, but on the efficacy of her prayers to her Son.

Although no trace is found in the New Testament of any actual worship of the Virgin Mary, yet Rom. Cath. interpreters regard the language of the angel Gabriel, who saluted her as 'full of grace,' or highly 'favored,' and as 'blessed among women,' and her own prediction in the canticle of the Magnificat, that 'all generations should call her blessed' (Luke i. 48), as a foreshadowing of the practice of their church; and they rely equally on the language employed by the early Fathers, e.g., Irenæus, (1st c.) regarding the Virgin, 'Mary, being obedient, became both to herself and to all mankind, the cause of salvation; what the virgin Eve bound by unbelief, this virgin Mary unbound by faith; as by a virgin the human race had been given over to death, by a virgin it is saved' (*Iren. adv. hæreses*). It is conceded by Catholic divines that during the first ages devotion to Mary and the other saints held a very subordinate place in Christian worship; the reason was probably the fear lest the neophyte converts from Paganism should misconstrue the honor paid to the mother of God.' But,

after the condemnation of Arianism in the Nicean council and of Nestorianism in the council of Ephesus which styled Mary 'Theotokos' or Mother of God, the devotion of the faithful had freer expression. St. Augustine (5th. c.) 'will allow no question of sin to be raised when Mary is concerned'—an anticipation of the doctrine of the Immaculate Conception. St. Proclus, patriarch of Constantinople (5th c.) salutes Mary as the 'Fair Bride of the Canticles,' 'Stay of Believers,' 'The Church's Diadem.' Such appellations as these are fairly parallel with those of the modern litanies of the Blessed Virgin censured by Farrar, yet may date from an age 1000 years before the Protestant Reformation.

The chief festivals of the Virgin, common to the Western and Eastern Churches, are the Conception, the Nativity, the Purification, the Annunciation, the Visitation, and the Assumption. All these festivals are retained in the calender of the Church of England. The Roman Church has several special festivals with appropriate offices—all, however, of minor solemnity.

For the Protestant view see the Rev. G. Stanley Faber's *Difficulties of Romanism;* for the Catholic view Bishop Challoner's *Catholic Christian Instructed.*

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MARION, *măr'ĭ-on* or *mā'rĭ-on:* city, cap. of Grant co., Ind., on the Mississinewa river at the junction or convergence of the Cleveland, Cincinnati, Chicago and St. Louis and other railroads, 40 m. s.e. of Logansport and 68 m. n.e. of Indianapolis. M. is in a fertile agricultural region and one containing an important natural-gas field. The river gives plentiful water-power. The industries of M. include iron foundries and machine-shops, rolling mills, glass, pulp, paper, furniture and linseed oil factories, flour mills, lumber and brick yards. The trade of M. is extensive, principally in local manufactures and farm products. There is a handsome public library, a large normal college, court-house and several churches and schools. Three miles S. of M. is a National Soldier's Home which cost over $1,500,000. Electric light and water supply plants are owned and operated by the city. Pop. (1910) 19,359.

MARION, *măr'ĭon* or *mā'rĭ-on:* city, cap. of Marion co., Kan.; on the Cottonwood river and the Chicago Rock Island and Pacific railroad; 165 m. s.w. of Kansas City. It is the site of an ancient Indian village; has waterworks (cost $75,000), municipal building (cost $15,000), national and state banks; and has valuable magnesian limestone quarries, mineral springs, and

natural gas wells in its vicinity. M. is a trade centre, being in a fertile agricultural region. Stock-raising is one of the leading industries. The chief products are flour and dairy produce. Pop. (1890) 2,047; (1900) 1,824; (1910 est.) 2,190.

MARION: city, cap. of Marion co., O.; 35 m. w.s.w. of Mansfield and about 45 m. n. of Columbus, on the Pennsylvania, Erie and other railroads. M. is an active and progressive industrial centre. There are factories, employing in the aggregate hundreds of hands in the construction of carriages, furniture, farming implements, steam engines, grain elevators, machinery, steam shovels, dredges, sashes and blinds. Lime and stone quarrying is carried on extensively. There are silk mills at M., also large mattress factories. Churches and schools are numerous. There is a library, court-house, several banks and important wholesale and retail business establishments. M. was settled in 1815 by people from Rhode Island. It was incorporated in 1820 and chartered as a city in 1890. The inhabitants are nearly all native-born. Among the institutions of M. is a home for Aged Women. Pop. (1870) 2,531; (1880) 3,899; (1890) 8,327; (1900) 11,862; (1910) 18,232.

MARION, *măr'ĭ-on*, FRANCIS: 1732-1795, Feb. 28; b. in Winyaw, near Georgetown, S. C., of a Huguenot family. In 1759 he served in a troop of volunteer cavalry, commanded by one of his brothers, against the Cherokees; and on similar expeditions 1760 and 61. He was elected to the S. C. provincial congress 1775, and made capt. in Moultrie's regiment. Promoted to major, he took part in driving the British fleet from Charleston harbor, 1776, June 28. Next year he served in the defense of Ga., and had command of Ft. Moultrie, in Charleston harbor; 1779 he joined in the fruitless attack on Savannah. When Gates took command in the south, M. joined him with his independent brigade, but was not appreciated. 1780, Aug. 16, Gates was defeated at the battle of Camden, whereupon M. waylaid the British and took their prisoners from them. He was commissioned brig.-gen. 1780, and united with the main army after Greene took command; 1781, he and Lee took Ft. Watson, and so loosened the British hold on S. C.; and, Sept. 8, at Eutaw Springs, he commanded the American right, and helped pursue the enemy. After the British evacuated Charleston, 1782, Dec. 14, he disbanded his brigade, and retired to quiet life as a small farmer; from which he was soon again called to serve in the state senate, which he did until 1790, when he was made member of the convention for framing a constitution for the state. In 1784 he was made commandant of Ft. Johnson.

MARIONNETTE, n. *măr'ĭ-ŏ-nĕt'* [F. *marionnette* for *mariolette*, a puppet: a dim. of OF. *mariole*, a doll, a puppet—from *Marĭă*, the Virgin Mary]: originally little figures of the Virgin Mary; a puppet: PLU. a puppet show; little jointed puppets of wood or card-board, representing men and women, and moved by means of cords or springs by a concealed agent. They are exhibited in what are called marionnette theatres, the exhibitor varying his voice, so that a sort of dramatic performance is accomplished. This entertainment, indications of which have been discovered in the tombs of Egypt, was known to the Greeks, and from them passed to the Romans. In modern times, it has prevailed chiefly in France and Italy, and has there reached a respectable degree of artistic perfection.

MARI'ON HAR'LAND (*pseudonym*): see TERHUNE, MARY VIRGINIA.

MARIOTTE, *mâ-rē-ŏt'*, EDME: French natural philosopher; b. in Burgundy during the first half of the 17th c.; d. 1684. He was the prior of St. Martin-sous-Beaune, when the Acad. of Sciences admitted him within its pale 1666. His life was spent almost wholly in his cabinet, among his books and instruments. M.'s forte was in an extraordinary power of drawing conclusions from experiment. He repeated Pascal's experiments on gravitation, and detected some peculiarities which had escaped that ingenious philosopher; confirmed Galileo's theory of motion; enriched hydraulics with a multitude of discoveries, and finally made a thorough investigation into the subject of the conduction of water, and calculated the strength necessary for pipes under different circumstances. His collected works were published at Leyden 1717, and at the Hague (2 vols. 4to) 1740. His *Traité du Mouvement des Eaux* was published by La Hire (Paris 1786, 12mo).

MARIOTTE', LAW OF; an empirical law deduced by Boyle (q.v.) and Mariotte (q.v.) from two independent experiments, though Boyle's discovery seems to have preceded M.'s by several years. It is generally expressed as follows: *The temperature remaining the same, the volume of a given mass of gas is in inverse ratio to the pressure which it sustains.* This law may be held to be substantially correct within a considerable range of pressure. But the labors of Regnault have made it evident that atmospheric air and most other gases, especially under very high pressures, are really more compressed than if they followed the law. This deviation is most marked in the case of gases which are in course of being liquefied, as they approach the point of liquefaction. *Mariotte's Instrument* is a J-shaped tube devised to demonstrate the law.

MARIPUT, n. *măr'ĭ-pŭt* [unascertained]: the zoril, an animal of the skunk kind.

MARIS, *mâ'rĭs*, JAKOB: Dutch painter: b. at The Hague, 1837, Aug. 25. He early began his art studies at the local academy, choosing landscape as a specialty, and receiving instruction from Ströbel and Van Hove, which latter he followed on his removal to Antwerp. He studied also under Keyser, director of the Antwerp Academy. Going to Paris he came under the influence of the Barbizon school, and reached his full power as a painter of figures and landscape in combination. In 1871 he returned to his native town. He is quite modern in his artistic conceptions and methods of handling, and shows no sympathy with the style of the early Dutch school. His brush work and use of chiaroscuro are essentially French. Among his numerous works are: *View of Schiedam; View of a Town in Holland; On the Sea Shore; Mother and Children; Bridge and Canal in Rotterdam.* He has also executed water colors and etchings.

MARISH, n. *măr'ĭsh* [F. *marais,* a marsh, a bog—from OF. *maresc*—from mid. L. *maris'cus;* O.Ger. *marsch,* a marsh; AS. *mersc,* a marsh]: in *OE.,* low wet ground; a marsh; a bog: ADJ. marshy; swampy.

MARIST, n. *măr'ist* [F. *Mariste*—from *Marie,* the Virgin Mary]: in *chh. hist.,* a congregation founded, 1836, by some priests at Lyons for the education of the poor and for mission work. They wear the ordinary dress of secular priests, but take solemn vows.

MARITAL, a. *măr'ĭ-tăl* [F. *marital,* marital—from L. *maritālis*—from L. *marītus;* F. *mari,* a husband]: pertaining to a husband. *Note.*—The word is frequently used erroneously in the sense of pertaining to marriage.

MARITIME, a. *măr'ĭ-tĭm* or *măr'ĭ-tīm* [F. *maritime*—from L. *marĭtĭmus,* belonging to the sea—from *mărĕ,* the sea: It. *maritimo*]: pertaining to or connected with the sea; done on the sea; having a navy and commerce by ships, as a state or power; situated near the sea. MARITIME NATIONS, nations that have seaports, a navy, and commerce by ships. *Note.*—MARITIME denotes 'bordering on the sea,' as a *maritime* town or nation; 'belonging to those bordering on the sea,' as *maritime* laws or rights. MARINE denotes 'of or pertaining to the sea,' as *marine* productions, a *marine* shell; 'transacted at sea,' or 'doing duty on it,' as *marine* service, *marine* forces.

MARITIME LAW: a system of established legal rules which particularly relates to the affairs and business of the sea, to ships, their officers and crews, navigation, and to marine conveyances of property. The character and pursuits of marine life, and the commerce related thereto are of a nature peculiar to themselves, and these distinctive features were recognized at a very early period in the history of the civil and the common law, and were noted under the collective term merchant marine.

MARITIME LAW.

The ships of a nation are considered as a part of its territory wherever they may wander in the pursuits of commerce. Many of the most important principles of international law grew out of maritime transactions between the various countries of the world, and these principles are as sacred and as rigidly enforced as any of the laws founded upon the comity observed between the different powers. While the great mass of maritime law is the same in all commercial nations, yet in each country peculiarities exist as to some of its rules, and as to the manner in which they are enforced. These differences are owing in a large measure to the municipal laws of the various countries, and as a general rule affect only their own merchants or people in their relations to each other; whereas in matters affecting foreigners the law of the whole commercial world is rigidly observed and enforced. Any nation may adopt its own maritime code but still the mutual relations of commerce and intercourse demand that in all essential things there be a well established and generally observed uniform law founded on natural reason and justice. But every nation reserves the right to make such modifications as locality, the changes wrought by time, and the genius of its people and institutions may demand. The maritime law of each nation may be regarded as distinctively its own; the laws adopted by the respective maritime nations make the basis and groundwork of what is recognized as the maritime law of the world; and the laws of the different countries may have their local distinctions and peculiarities without affecting the general and harmonious integrity of the system, as the differences affect only their own citizens.

The high court of admiralty erected in England by Edward III. was of very extensive jurisdiction, embracing all maritime matters. The court has existed ever since in some form, although many modifications have been made. Many of the principles of the English maritime court were adopted by the United States when the separation from the mother country took place, in much the same manner that the English common law was adopted by this country. In the United States the federal courts, more particularly the United States district courts, have jurisdiction in marine matters, both civil and criminal, the jurisdiction of the latter being original, and that of the circuit and supreme courts being appellate only. The jurisdiction of the federal courts extends to navigable rivers of the United States, whether tidal or not, the lakes, and the waters connected therewith; and it has been decided that the jurisdiction of the federal courts extends to navigable waters of a river lying entirely within one state. It has also been held that French consuls had no jurisdiction within the states, in matters of admiralty relating to French vessels. It has been conceded by the federal courts that

state laws upon the subject of pilotage conferred upon the state courts concurrent but not exclusive jurisdiction with that of the federal courts.

It is difficult to conceive of a matter connected with marine affairs which has not been provided for in our marine laws, rules, and regulations, or by the decisions of our courts. On the civil side all matters relating to collisions, freights, charter-parties, demurrage, salvage, bonds of bottomry and respondentia or hypothecation of ship and cargo, seizure under the laws of impost, prize matters, general average, adjustments, libel for seaman's wages, or libel for other causes, liens for labor or materials, furnished for building or repairs upon marine crafts or for marine works, injuries to seamen, negligence of master or owners, surveys of vessels, towage, wharfage, jettison, marine contributions, dockage, and other kindred subjects are taken charge of and adjusted. Under the civil proceedings one of the most important in extent and complication is the law relating to customs. Through the customs and revenue regulations are derived immense sums of money, as a revenue for government, but an important provision connected with them is a fund which is expended in the maintenance of hospitals for the care of sick and injured marines. The admiralty laws have also a criminal jurisdiction, which extends to all crimes and offenses committed on the high seas, beyond the jurisdiction of any country, such jurisdiction, as generally understood, covering a marine league, or about 3 m. The criminal jurisdiction of the United States admiralty court extends to the Great Lakes, as it has been held by the courts that the open waters of those lakes are high seas within the meaning of the statute of the United States. A crime committed on board a vessel in one of our navigable rivers would not give the federal courts jurisdiction of the offense, but such an offense would be cognizable in the courts of the state within which it was committed.

It is one of the chief merits of our marine law that it aims to care for our seamen in all of their relations to the hazardous business in which they are engaged. The term mariner includes all persons employed on board vessels during a voyage to assist in their navigation and preservation, and to aid in the purposes for which the voyage is undertaken. This includes masters, mates, sailors, surveyors, carpenters, coopers, engineers, firemen, pilots, waiters, male or female, etc. The term shipping applies to all sorts of craft, whether propelled by wind, steam, or other power. It is true that there are certain rules and regulations which, from the necessity of the circumstances, apply specially to craft propelled by steam which do not apply to those which depend upon the wind to send them forward. The United States Congress has enacted laws by which both steam and sailing vessels are to be built, registered or enrolled, manned,

victualed, and navigated. Those laws show a constant aim toward a more humane and enlightened treatment of the common sailor than formerly prevailed, and which in some countries prevails today. When an American seaman is discharged in a foreign country, even with his own consent, or when the ship is sold there, and her company discharged, three months' extra pay is by our laws required to be deposited in the hands of the American consul for the seaman's benefit. Recent laws have prohibited the infliction upon sailors of corporal punishment, once so common. Many other changes in the interest of the common sailors have been enacted by Congress, with a view to promote their health, comfort, and financial welfare. The master of a vessel, often called 'ship's husband,' while on voyages at a long distance from the home port, or the place where the vessel is owned, is charged with great responsibility, and he is clothed with an authority commensurate with that responsibility, to enable him to act promptly and efficiently in times of emergency and peril. He has full control of the ship and its cargo. He may abandon the vessel or lighten it by throwing the cargo or some portion of it into the sea. In case of shipwreck from which some portion of the cargo is saved, or the ship brought to land in a damaged condition, in the absence of an opportunity to communicate with the owners, he may sell such property as has been saved from the wreck when prudence or circumstances require it, and he has the right to decide what ought to be done under the circumstances. In case of necessity he may, in the absence of opportunity to communicate with the owners, raise money by bottomry loan on the ship or her freight, or by respondentia on the cargo, or upon them all, by bonds pledging them at a high rate of interest, known as marine interest. Such bonds are to be paid when the ship arrives at her destination or at some designated port. If she does not arrive it follows that the bond is not good and payable. The holder of such bonds acquires an insurable interest in the property so pledged, and may secure his loan in an additional manner by insurance. The master may make contract for repairs upon his ship, when beyond the reach of prompt communication with the owners, and his reasonable contracts so made will be binding upon the owners. It not infrequently happens that serious questions arise as to the necessity for any repairs, or as to the extent of such necessity. Such questions may be obviated, in any American port, at least, by the master calling for a survey. The proper course for a master to pursue when within reach of a court of admiralty is to apply to it for directions how to proceed, and the directions of the court will furnish him full immunity when faithfully followed.

Salvage is an important and interesting provision in maritime law. It is such compensation as may be justly

due to persons by whose voluntary assistance a ship or its cargo has been saved for the owners when in great peril, or after being abandoned by the officers and crew. The right to salvage depends solely upon the question whether the property has been saved from the perils of the sea. The amount of salvage to which the salvors will be entitled depends very largely upon the extent of the risk or the perils to which the property was subjected, and the perils of making the rescue. In most cases reported our courts have given one-half of the value of the property saved; in some instances a larger percentage, and in a few cases an award of seven-eighths has been given. Somewhat akin to salvage is the subject of contribution. It sometimes becomes necessary to lighten a ship in a storm by throwing overboard a part of the cargo. If the cargo belongs to several persons and the portion so thrown overboard belongs to one or to only a part of the owners, those whose property has been saved from impending danger by the jettison, as the throwing overboard is called, are required to contribute to the loser in what is termed general average. Demurrage is an allowance for damage by the detention of a vessel. A master is always obliged to proceed with such despatch as he can consistently with safety, and a merchant or other person who loads a vessel or receives a cargo is bound to give it reasonable despatch. It is usual in a charter-party, or verbally, to provide for the number of lay-days in which a vessel shall be loaded or discharged, and for every day in excess of the number so specified the person responsible for such delay is required by the law merchant to make proper compensation.

Consult: Benedict, *Admiralty Law;* Parsons, *Treatise on Maritime Law* (1858); Pritchard, *Digest of Admiralty and Maritime Law* (1887); Abbott *Law of Merchant Ships and Seamen* (1903); *American and English Encyclopedia of Law;* article 'Admiralty.'

MARITIME PROVINCE, in the Russian empire: part of the general-governorship of Eastern Siberia; extending along the Siberian coast of the Pacific from Corea to the Arctic Ocean, and including Kamtchatka (q.v.), the upper half of the island of Saghalien, and several small islands along the coast; length 2,300 m. width 40 to 420 m.; 730,000 sq.m.; capital Khaborovka, at the confluence of the Amur and Usuri rivers. The northern part, land of the Chukchees. occupies the n.e. peninsula of Asia between the Arctic Ocean and the seas of Behring and Okhotsk, and contains the highest known mountains (about 8,200 ft. high) within the arctic circle. The middle part is a strip 40 to 60 m. wide along the shore of the sea of Okhotsk, occupied by mountains 4,000 to 7,000 ft. high. The inhabitants are Tunguses, who live by hunting and fishing. The southern part includes two distinct regions. A wide and deep depression runs from

the n.e. extremity of the Bureya range s.w. to the junction of the Amur and Usuri rivers, thence to the lowlands of the lower Sungari river. The best part of the whole province is at the southern extremity in the valley of the Suifun river. Pop. (estimated) 20,000 Russians, 37,000 natives.

MARITZA, *mâ-rĭt'sâ* (the ancient *Hebrus*): river of European Turkey, rising in the Balkans, and flowing e.s.e. through the province of E. Roumelia to Adrianople, where it bends s., and falls into the Ægean by the Gulf of Enos. It is more than 300 m. in length, and is navigable to Adrianople, about 100 m. from its mouth.

MARIUPOL, *mâ-rē-ô'pol*, or MARIAMPOL, *mâ-rē-âm'pol:* seaport in the government of Ekaterinoslav, Russia, near the place where the Kalmius falls into the Sea of Azov, 60 m. w. of Taganrog. It was founded 1779 by Greek emigrants from the Crimea, and the port was opened to foreign vessels 1836, when 20 ships entered it; but afterward their number increased to more than 300. The articles of export are wheat, linseed, wool, and hides from the adjacent provinces, the value being about $2,500,000. The imports are insignificant, ships usually arriving in ballast. The harbor is shallow, and, like all ports on this sea, is becoming more so. The speech is a corrupt jargon derived from the Turkish and Greek languages. Pop. about 16,000.

MARIUS, *mā'rĭ-ŭs*, CAIUS: Roman general: B.C. 155—86; b. at the village of Cereatæ, near Arpinum, of obscure family. In the Numantine war, B.C. 134, beginning as a soldier in the ranks, he served with great distinction under the younger Scipio Africanus, who treated him with high consideration, and even indicated that he thought him a fit successor to himself. B.C. 119 he was elected tribune of the plebs, and signalized himself by his vigorous opposition to the nobles, by whom he was intensely hated. B.C. 114 he went to Spain as propretor, and cleared the country of the robbers who infested it. He now greatly improved his position by marrying Julia, aunt of Julius Cæsar. He accompanied Q. Cæcilius Metellus to Africa B.C. 109, was elected consul two years later, and intrusted with the conduct of the Jugurthan war, which he brought to a successful close in the beginning of B.C. 106. From this period dates the jealousy between him and L. Sulla, then his questor, which was ultimately productive of so many horrors. Meanwhile, an immense horde of Cimbri, Teutones, and other northern barbarians, had burst into Gaul, and repeatedly defeated the Roman forces with great slaughter. Marius was again called to the consulate B.C. 104, and for the third, fourth, and fifth time in the following years, B.C. 103 to 101, for it was felt that he alone could save the republic from the great armies that hung like a cloud over its northern border. The war against the Teutones in Transalpine Gaul occu-

pied him more than two years: but he finally annihilated them in a battle of two days' duration at Aquæ Sextiæ, now Aix, in Provence, where 200,000—according to others, 100,000—Teutones were slain. After this, he assumed the chief command in northern Italy against the Cimbri (q.v.), whom he also overthrew, near Vecellæ, to w. of Milan, with a like destruction, B.C. 101. The people of Rome knew no bounds to their joy. Marius was declared a savior of the state, the third founder of Rome, and his name was mentioned along with those of the gods at banquets. He was made consul for the sixth time B.C. 100. It has often been remarked, that, had he died at this period, he would have left one of the greatest reputations in Roman history. When Sulla, as consul, was intrusted with the conduct of the Mithridatic war, Marius, who had long manifested an insane jealousy of his patrician rival, attempted to deprive him of the command, and a civil war began B.C. 88. Marius was soon forced to flee, and after enduring the most frightful hardships, and making numerous hairbreadth escapes, he reached Africa, where he remained until a rising of his friends took place under Cinna. He then hurried back to Italy, and, with Cinna, marched against Rome, which was compelled to yield. Marius was delirious in his revenge upon the aristocracy; a band of 4,000 slaves carried on the work of murder for five days and nights. Marius and Cinna were elected consuls together for the year B.C. 86, but Marius died after he had held the office 17 days.

MARIVEAUX, *mâ-rē'vō*, PIERRE CARLET DE CHAMBLAIN DE: French dramatist and novelist: b. Paris, 1688, Feb. 4; d. there 1763, Feb. 12. Of his life practically nothing is known save that he became an Academician in 1742 or 1743. He wrote essays in periodical form, the *Spectateur Français* having a hint of English influence in both matter and name. His novels, especially the unfinished *Vie de Marianne* and *Paysan parvenu*, were a protest against the literary morals of contemporary fiction. But he is best known for such plays as *Les Jeux de l'Amour et du Hasard* (1730); *Les Fausses Confidences* (1738); *Le Legs* (1736); and *La Mère confidente* (1735), which are marked by a total opposition to the style and manner of Molière, by much skill in intrigue and in portraying women, and by the peculiarly artificial and elaborate style, which takes its name 'Marivaudage' from the author. Consult: Savollée *Marivaux inconnu* (1880); Fleury, *Marivaux et le Marivaudage* (1881); Gossot, *Marivaux Moraliste* (1881); Larroument, *Marivaux, sa Vie et ses Œuvres* (1894); Deschamps, *Maurivaux* (1897).

MARJORAM, n. *mâr'jō-răm* [F. *marjolaine*—from mid. L. *majōrăca*—corrupted from L. *amārăcus*, marjoram: Ger. *majoran;* It. *majorana*], (*Origanum*): genus of plants of nat. ord. *Labiatæ*, having a ten-ribbed, five-

toothed calyx, loose spikes, and broad bracts. The species are annual, perennial, and shrubby plants, natives chiefly of the East, and of the countries bordering the Mediterranean. They abound in a yellow essential oil—*Oil of Marjoram* or *Oil of Origanum*—obtained from some of the species by distillation.—The COMMON MARJORAM (*O. vulgare*) with purplish bracts, is European; rare in North America. It is perennial, has a stem about 12 in. high, ovate leaves, and roundish, panicled, crowded heads of purple flowers, with large bracts. It is aromatic, and is used, as are also other species, as a seasoning in cookery; and an infusion of it is a stimulant, tonic, and remedy for nervousness. The powder is an errhine. The essential oil is used as a palliative of toothache, and is mixed with olive oil, to make a stimulating liniment, deemed a remedy for baldness and in rheumatic complaints, and in cases of sprains and bruises.—The SWEET MARJORAM of gardens (*O. majorana*) is an annual plant, a native of Greece and the East, with ovate grayish-green leaves, covered on both sides with a thin down, about three roundish heads of flowers growing close together, wrinkled bracts, and small white flowers. Its uses are similar to those of the common marjoram.

MARK, n. *mârk* [AS. *mearc*, a mark, a boundary: Dut. *merk;* Icel. *mark;* O.H.G. *marc*, a mark, a token: Icel. *merkia*, to mark, to signify]: any visible impression, as a line, streak, or channel; any sign of distinction; a print; a stamp; evidence; sign; notice taken; an object; that at which a missile is directed; conspicuous character, as a man of *mark;* impression produced by ability or character, as 'he has made his *mark';* the X made by a person who cannot write his name.—Mark as a geographical term (primarily the *mark* of a country's limits—the *march*—see under MARCHES) was formerly a designation of the border countries or districts of the German empire, conquered from neighboring nations; e.g., the marks of Austria, of N. Saxony or Brandenburg, Lausatia, Moravia, Steiermark, etc. V. to draw or make an impression on or in; to impress with a token; to denote; to heed or regard; to observe. MARK'ING, imp. MARKED, pp. *mârkt'*. MARK'ER, n. *-ėr*, one who marks; one who registers the scores at billiard tables. MARKS, n. plu. *mârks*, the depths of the lead-line, which are marked by having a distinguishing piece of leather, cord, or bunting rove through the strands; the numerical value of an examination, as, he gained 50 marks out of 70. MARKING-INK, indelible ink, used for putting private marks on linen. MARKS'MAN, he who shoots. LANDMARK: see under LAND. TRADEMARK: see under TRADE. TO MARK OUT, to notify by a mark; to point out; to designate. TO MARK TIME, in *mil.*, to notify the rate of step by movements of the foot; in *music*, to notify the time by the movements of the foot, hand, or other

means. BESIDE THE MARK, having nothing to do with the question; irrelevant; eminently unreasonable; out of all reason. UP TO THE MARK, having the proper qualification, as of stature, knowledge, strength, skill—from the standard mark for the height of recruits.—SYN. of 'mark, n.': impression; impress; vestige; track; trace; proof; token; symptom; characteristic; badge; indication; brand; butt;—of 'mark, v.': to impress; imprint; note; notice; remark; regard; show; heed; point out; indicate; brand; stamp; characterize; evince; betoken.

MARK, n. *mârk* [AS. *marc;* Ger. *mark*, a piece of money: Icel. *mork*, a measure, 8 oz. of silver]: the standard weight of the money system of various countries of Europe. In Germany, the mark varied at different times and places; but ultimately the Cologne mark was half a Cologne pound, or 233.8123 grammes; this was the standard till 1857. Since 1871, a new mark is the basis of the new imperial money system: it is 0.358023 grammes of gold, and in silver there are 100 to the pound, or 200 to the kilogramme. The one-mark piece is silver, equal to a shilling sterling (about 24⅓ cents), and is divided into 100 pfennigs; there are gold 5, 10 and 20 mark pieces. The Lubeck mark, a coin formerly current at Hamburg, was worth 1*s.* 2½*d.* (nearly 29½ cents); the *mark banco* there, a money of account, was 1*s.* 5½*d.* (nearly 35½ cents). In the old French system, the *marc* (= 192 deniers or pennyweights) was half of the *livre paids de marc*, and the latter was 0.4895 of a kilogramme. In England, marks are first heard of in the treaty between Alfred and Guthrum the Dane, and are supposed to have been then a Danish reckoning. The mark was not a coin, but only a money of account, or rather a weight. In 1194 the mark had the nominal value which it ever afterward retained, 160 pennies or 13*s.* 4*d.*, ⅔ of the nominal 'pound' (nearly $3.25). The gold noble, first struck by Edward III., was worth half a mark—6*s.* 8*d.* (nearly $1.62½). In Scotland, the mark or *merk* was a weight for gold and silver, or common money reckoning; also a coin. The coin, like the other Scotch coins, had only one-twelfth of the English value: nominally 13*s.* 4*d.* (nearly $3.25), it was worth 1*s.* 1⅓*d.* English (about 27 cents). There were two-merk, one-merk (4½ to the oz.), half, and quarter merk pieces. The mark, till lately a standard weight for gold and silver in most European countries, has been generally superseded by the metric system.

MARK, or JOHN MARK: one of the four Evangelists (Heb. name *John*, Acts xiii. 5, 13; Lat. surname *Mark*): a Jew; b. probably in Jerusalem (see Acts xii. 12); appears first about A.D. 45 in company with Barnabas and Paul. The identity of the John Mark of the Acts with the Mark of Paul's epistles has been denied by a few distinguished scholars; but the early and increasing verdict of scholars is for the identification. Mark was cousin

of Barnabas (Col. iv. 10), and accompanied him and Paul on a missionary tour to Antioch, Cyprus, and Perga in Pamphylia, where, leaving them, he returned to Jerusalem; and went afterward to Cyprus, and thence to Rome (Acts xiii.; Col. iv. 10; II Tim. iv. 11). Ecclesiastical tradition speaks of a missionary expedition of Mark to Egypt and w. Africa, of his suffering martyrdom about 62 or 66 (the Coptic Church still consider him their founder and first bishop), and of the transmission of his corpse to Venice, which city has chosen him for its patron saint; this tradition mostly lacks authority. The festival (Apr. 25) which the Rom. Cath. Church holds in his honor (the day has place also in the calendar of the Prot. Episc. Church) is no older than the close of the 7th c. Mark's departure from Paul and Barnabas on their tour occasioned a 'sharp contention' between those apostles on a later occasion; and Barnabas 'took Mark with him and sailed away unto Cyprus' (Acts xv. 38, 39). But after a few years, and thereafter through Paul's whole apostleship, Paul warmly commends Mark as his fellow-laborer in the gospel; and a little previous to his martyrdom asks Timothy to bring Mark with him to Rome, 'for he is very profitable to me.' Possibly, Paul may, on further reflection, have thought his first judgment hasty; or possibly Mark may have been helped to new steadfastness of purpose by Paul's early rebuke.

Mark was doubtless one of Peter's converts (see I Pet. v. 13), and the second Gospel, which has always from the beginning been ascribed to him, has always been understood to have been written under the sanction and guidance of Peter, as was that of Luke under the sanction and guidance of Paul. See MARK, THE GOSPEL, etc.; GOSPELS.

MARK, THE GOSPEL ACCORDING TO: canonical book of the New Testament; the second Gospel; universally ascribed to the evangelist Mark (q.v.), written, according to ancient testimonies, at Rome, in the Greek language. Its date is not known: it was assigned to A.D. 43 by Eusebius; but all that can be asserted with positiveness is that all internal and external evidence points to a date before the destruction of Jerusalem (70). The ending, xvi. 9-20, though certainly very ancient—and probably entirely credible—is no longer generally deemed a part of Mark's original Gospel: it is not in either the Vatican or the Sinaitic manuscripts. This Gospel, which many scholars now deem the earliest written of the New Testament books, is at least the most primitive and direct of the four Gospels in style, method, and material. It was written for Gentile converts. See MARK (or JOHN MARK); GOSPELS.

MARK AN'TONY. See ANTONIUS, MARCUS.

MARKER OUT: the workman who marks out the

centres and the working lines of metal work preparatory to the operations of the machinists and the fitters.

MARKET, n. *mâr'kĕt* [L. *mercātum,* trade, market—from *mercārī,* to traffic: Icel. *markadr;* Ger. *markt,* a market: comp. Gael. *marc,* a horse; *margadh,* a market]: a public place or building for buying and selling; purchase and sale; place or country of sale (also, see FAIRS): V. to deal in a market; to buy or sell. MAR'KETING, imp.: ADJ. bargaining at a market; attendance upon a market. MAR'KETED, pp. MAR'KETABLE, a. *-ă-bl,* fit for the market; saleable. MAR'KETABLENESS, n. *-bl-nĕs,* the state of being fit for market. MARKET-BELL, a bell which rings at the opéning and close of a market. MARKET-CROSS, the place where a market is held, sometimes marked by an anc. cross. MARKET-GARDENER, one who raises vegetables and fruits for sale. MARKET-OVERT, in *law,* an open market. MARKET-PLACE, the place where goods are exposed for sale. MARKET PRICE or RATE, the current price of goods at any given time. MARKET-TOWN, a town having the privilege of holding a market. MARKET-WOMAN, one who attends a market to sell her wares. See MART, and note.

MARK TWAIN. See CLEMENS, SAMUEL LANGHORNE.

MARKHAM, *mârk'am,* ALBERT HASTINGS: English admiral and Arctic explorer, cousin of Sir Clements Markham (q.v.): b. Bagnères, 1841, Nov. 11. He entered the navy in 1855, saw active service in the China seas for several years, took part in the polar expeditions of Adams (1873) and of Nares (1875), and in the latter expedition attained what was then the farthest north, 83° 20′ 26″. With Sir Henry Gorn-Booth he attempted to reach Franz Joseph Land in 1879, but was unsuccessful; in the next year Markham explored the Galapagos Islands. Rear-admiral in 1892 and second in command of the Mediterranean fleet in 1893, he became vice-admiral and later admiral, from 1901-4 commanding at the Nore. He has written: *The Cruise of the Rosario amongst the New Hebrides* (1873); *The Great Frozen Sea* (1878); *The Voyages and Works of John Davis* (1884); *A Polar Reconnaissance* (1879); *Life of Sir John Franklin* (1890); etc.

MARKHAM, Sir CLEMENTS ROBERT: English geographer and traveler: b. Stillingfleet, near York, 1830, July 20. He was educated at Westminster School, entered the navy in 1844, accompanied the Franklin Search Expedition of 1850, and then retired from the service. He traveled in Peru in 1852-4 and 1860-1, the second journey being undertaken to get cinchona seeds for planting in India, an experiment described in his *Peruvian Bark; Cinchona Culture in British India, 1860-1880* (1880). After spending 1865-6 in Ceylon and India, he became secretary of the India Office in 1867 and curator of its Geographical Department in 1868. In 1858, he had been

appointed secretary of the Hakluyt Society, of which he became president in 1890. From 1863-88 he was secretary of the Royal Geographical Society, and in 1893 its president. His more important works, several of which were translated into German, are: *Cuzco and Lima* (1856); *Travels in Peru and India* (1862); *The Aretic Navy List* (1875); *Life of John Davis* (1889, in a series, *The World's Great Explorers*); *Major James Rennell* (1895); *Richard Hakluyt* (1896); *Life of the Great Lord Fairfax; The Fighting Veres; History of Peru; History of Persia; History of the Abyssinian Expedition; The Life of Columbus; The Paladins of Edwin the Great;* and an English version of a Peruvian drama, *Ollanta* (1871). He edited *The Geographical Magazine* from 1872 to 1878 and was knighted in 1896.

MARKHAM, Edwin: American poet: b. Oregon City, Ore., 1852, Apr. 23. He spent his boyhood on a ranch in central California, herding cattle and sheep, and later graduated from the California State Normal School at San José and from Santa Rosa College. He studied law, but did not practise; subsequently took up educational work, and was superintendent and head master of schools in California, and principal of the Observation School of the University of California in Oakland. He had for some time been an occasional contributor to some of the leading American magazines, but first gained wide reputation through the publication of his poem, *The Man with the Hoe,* suggested to him by Millet's picture of the same name. This first appeared in the San Francisco *Examiner* and was later published in a collection entitled *The Man with the Hoe and Other Poems* (1899). This poem, which had a wide influence and caused much discussion, is intended by the author not merely as a picture of the peasant but as 'a symbol of the toiler brutalized through long ages of industrial oppression.' His other publications include: *Lincoln and Other Poems* (1901); *Field Folk, Interpretations of Millet* (1906); *Virgilia and Other Poems;* etc.

MARKHAM, Jared Clark: American architect: b. Tyringham, Mass., 1816, Nov. 18. He designed the battle monument at Saratoga and has published *Appeal to the American People in Behalf of National Monuments* (1872); *Monumental Art* (1884); *Historic Seulpture* (1886).

MARKHAM, William: English colonial governor in America: b. England, about 1635; d. Philadelphia, 1704, June 12. When William Penn obtained a charter for Pennsylvania, he made Markham, a first cousin of his, his deputy. Markham had all rights granted to Penn save that of convoking a legislative assembly. On Aug. 3, 1681, he established a council, later chose the site for Philadelphia, and conferred with Lord Baltimore as to the Maryland-Pennsylvania boundary. Penn himself arrived on Oct. 27, 1682, and Markham, whose commis-

sion accordingly lapsed, was elected to the council. In 1684-99, he was secretary to the province, in 1686 became land commissioner, and in 1689 an auditor of accounts. When in 1691 the territory now constituting the state of Delaware was detached from the province, he was appointed its deputy-governor, and in 1694-9, as lieutenant-governor, administered both this territory and the province.

MARKHOR, *mâr'kôr:* a remarkable goat (*Capra falconeri*) of the mountains of Afghanistan and northwestern India, where it keeps among the highest wooded valleys, ascending and descending only as compelled to do so by the seasonal changes in the depth of the snow. It is of large size, standing about 3 feet tall at the shoulders, and is reddish brown in summer and light gray in winter. 'The magnificent beard, extending in the adult males on to the chest and shoulders, and sometimes reaching nearly to the knees, is black in front and gray behind; in the young bucks and the does at all ages it is confined to the chin.' The horns are very different from those of other goats, rising straight up from the forehead, spreading sideways, so as to form a V when seen from in front, and spirally twisted. Specimens have measured 50 inches along the spiral keel. Several distinct local varieties of markhor are known to the Himalayan hunters, who regard this animal as one of the most excellent objects of sport in that region of prime game animals. 'Unlike the ibex, which keeps to the rugged crags and steep ravines above the limits of the forest, the markhor delights in rocky forests, and although it occasionally comes out into the open glades, it seeks concealment as much as possible.' Hence its hunting calls for the greatest skill as well as endurance. This goat is often captured, tamed and crossed with domestic goats; and it is believed to have had some influence in originating the Angora breed. Consult: Lydekker, *Wild Oxen, Sheep and Goats of All Lands* (1898).

MARK'ING-NUT: fruit of *semecarpus anacardium,* tree of nat. ord. *Anacardiaceæ,* native of the mountains of India. It is a large tree, with oblong leaves, and terminal panicles of flowers. The fruit is a heart-shaped nut seated on a large swollen receptacle which, when ripe, is roasted and eaten, and resembles a roasted apple, though when raw it is acrid and astringent. The nut is black, and a black acrid juice between the two coats of its shell is used for marking cotton-cloth—a mixture of quick-lime and water being applied to prevent its running and to brighten its color. It is used also as an external application in rheumatism.

MARKS' MILLS, Engagement at: on Apr. 23, 1864, a train of 240 wagons, escorted by 1,200 infantry, 400 cavalry, and five guns, all under command of Lieut.-Col. F. M. Drake, 77th Ohio Infantry, left Camden, Ark., for Pine Bluff, to get supplies for Gen. Steele's army, then

co-operating with Banks' Red River expedition. At 10 A.M. of the 25th, when at Marks' Mills, on the Camden and Pine Bluff road, about eight miles beyond Saline river, Drake was attacked front and rear by Gen. Fagan's force of 3,000 men—cavalry, mounted infantry, and two batteries—and after a hard fight of more than three hours, during which Drake was severely wounded, and had lost 250 in killed and wounded, the entire train, guns, and the greater part of the cavalry and infantry were captured. About 300 escaped and made their way to Little Rock and Pine Bluff. Incomplete Confederate returns show a loss of 41 killed, 108 wounded, and 144 missing. Fagan's entire loss was about 420. When Steele heard of the disaster he immediately abandoned the idea of joining Banks, left Camden on the night of the 26th for Little Rock, was followed by Sterling Price, had a rear-guard fight at Jenkins' Ferry on the 30th, and continued his retreat to Little Rock. Consult: *Official Records*, Vol. XXXIV.

MARL, v. *mârl* [see MARLINE]: among *seamen*, to wind or twist a small line or rope round another. MAR'LING, imp. MARLED, pp. *mârld*.

MARL, n. *mârl* [mid. L. *margĭla*, marl, a dim. of L. *marga*, marl: Dut. *marghelen*, to fatten land—from *mârgh*, marrow: It. *marga*, marl: Gael. *mairl*, to crumble, to bruise]: a natural mixture of clay and carbonate of lime in variable proportions, used for the fertilizing of land; a soil that falls readily to pieces on exposure to the air. Marls are found in very different geological formations, but everywhere seem to owe their origin to deposition by water. The name is sometimes applied to friable clays, or mixtures of clay and sand, in which there is almost no trace of lime; but the presence of a notable proportion (6 to 20 per cent.) of carbonate of lime is essential to marls, properly so called. Marly soils are in general of great natural fertility. Marl is very advantageously used as a fertilizer, acting both chemically and mechanically; but different kinds of marl are of very different value in this respect (see MANURE). To the presence of carbonate of lime in its composition, marl owes its use as a fertilizer. Hence it happens that many natural mixtures used as manures are called marls, such as the New Jersey green sand-marls, which contain as their principal constituents clay and greensand and usually only 1 or 2 per cent. of carbonate of lime. The latter use of the word is scarcely justifiable, especially as it is sometimes applied, notably in England, to substances containing no lime at all. This use of marl has been known from ancient times. An English statute of 1225 gave every man a right to sink a marl-pit on his own ground, and there is other evidence that the application of marl to land was common in England in the 13th c. Old marl-pits are common in parts of England. The quicker action and greater efficiency of lime have

led to its use in many cases instead of M., though some kinds of M. are extremely useful in some soils. The bulkiness of M. confines its use to the neighborhood in which it is found.—M. is sometimes indurated into a rock, and a slaty variety, containing much bitumen (*Bituminous Marl-slate*), is found in Germany and other countries. MARL, v. to manure with marl. MAR'LING, imp. MARLED, pp. *mârld*, manured with marl. MARLY, a. *mâr'lĭ*, consisting of or abounding with marl. MARLACEOUS, a. *mâr-lā'shŭs*, resembling marl; partaking of the qualities of marl. CLAY-MARL, when the clay predominates. MARL-CLAY, when the lime is most abundant. SHELL-MARL, marl which contains fresh-water shells. MARL-STONE, in *geol.*, the middle member of the Lias formation, consisting of arenaceous shales, laminated sandy limestones, and several bands of stratified and nodular limestone—the whole series being peculiarly rich in fossils.

MARLBOROUGH, *mârl'bŭr-ŭh:* city in Middlesex co., Mass.; on the Old Colony r.r.; 15 m. e. of Worchester, 25 m. w. of Boston. It is noted as a centre of boot and shoe manufacture. Other industries include the making of steam machinery, automobiles, hose pipes, bicycles, carriages and wagons, boxes, wooden-ware, tires, lamps, electrical appliances and cigars. There is a convent and academy (St. Ann's) at M., also a public library, G. A. R. building, city hall, several schools and churches. The town was settled in 1656 and became incorporated in 1660. It was chartered as a city in 1890. There is a soldiers' monument at M., several hotels and banks, also newspapers. The city covers several hills. It owns and operates the city waterworks. Pop. (1910) 14,579.

MARLBOROUGH, *mârl'bŭr-ŭh* or *mawl'-:* old and interesting town of England, Wiltshire; a municipal borough and market-town, pleasantly situated in the valley of the Kennet, 75 m. w.s.w. of London. It consists principally of one street of picturesque houses. As early as the days of Cœur-de-Lion, there was a castle at M.; and a parliment whose enactments were called the 'Statutes of Marlbridge,' was held here in the reign of Henry III. M. trades in coal, corn, and malt. *M. College* was incorporated 1845, and obtained an additional charter 1853; the number of pupils is between 500 and 600, of whom about 70, sons of clergymen, are on the foundation. Pop. of town, 3,012.

MARLBOROUGH, *mawl'bŭr-ūh* or *mawl'b'ro*, JOHN CHURCHILL, Duke of: greatest general and statesman of his time: 1650, June 24—1722, June 16; b. Ashe, Devonshire; of an old family impoverished by the civil wars. Without having received much education, he became a page in the service of the Duke of York, who gave him a commission as an ensign of guards in his 16th year. He was present at the relief of Tangiers, and in a number of engagements with the Moors, and after his return to England, rose to the rank of capt. in a regt.

sent to the Netherlands to support the French. In the campaign 1672–77, his brilliant courage and ability gained him the praise of the celebrated Turenne. When the war ended by the peace of Nimeguen, Churchill, now a col., returned to England. His advancement had been obtained, not merely on account of his own merit, but through the influence of his eldest sister, Arabella, mistress of the Duke of York. His prosperity was afterward still further secured by his marriage with Sarah Jennings (1660–1744), a lady as remarkable for talents and imperious disposition as for beauty. She became the chosen and most intimate friend of Princess Anne, over whom after her accession to the throne she exercised the influence of a superior and extremely active mind. When James II. ascended the throne, Churchill was made Baron of Sundridge, and raised to the military rank of general. He was active in suppressing Monmouth's rebellion, but on the landing of the Prince of Orange, he unscrupulously passed over to the side of the invader, and was rewarded by being made Earl of Marlborough. He aided in reducing Ireland to subjection; and having received from William III. the command of the troops employed against France in the Netherlands, evinced great ability as a gen. in the campaigns of 1689, 90, and 91. But 1692 he fell into disfavor with the king, and was dismissed from all his offices; and shortly afterward was even thrown into the Tower for a few days on the charge of maintaining treasonable correspondence with the exiled king. On the commencement of the War of the Spanish Succession, he was intrusted with the command of the British army in the Netherlands. The death of William, and the accession of Anne to the throne 1702, Mar., made M. virtually regent, though without the title. His wife governed the queen; her power was almost boundless; the whig ministry depended on her support, and she disposed of places and offices at her pleasure. The duke himself directed the minister Godolphin, whose son had married his daughter. A constant succession of victories strengthened his political power. In the campaign of 1702, he drove the French out of Spanish Guelders, in reward for which service the queen raised him to the rank of duke; and 1703, he campaigned again in the Low Countries. In 1704 he went to the support of the emperor in Germany, and joined Prince Eugene of Savoy; 1704, July, he stormed the French and Bavarian lines at Donauwörth, and Aug. 13, defeated a stronger French and Bavarian army in the memorable and decisive battle of Blenheim (q.v.). The parliament bestowed on him the estate of Woodstock, and the queen caused Blenheim Palace to be built for him, though it had to be finished at his own expense: see BLENHEIM HOUSE. In 1705, M. was made a prince of the empire. During 1705, M. was occupied chiefly with diplomatic negotiations; but 1706 he resumed that career of victory by which Louis XIV. was so completely humbled. In May of that year, the battle of Ramillies (q.v.) was fought, which com-

itself, and the white woolly coating on the interior being then removed, the rind is cut into thin strips, and boiled with the expressed juice of the pulp and a quantity of sugar equal in weight to the other ingredients. After the mixture has attained proper consistence, it is treated similarly to jam, jelly, and other preserves (see JAMS AND JELLIES). A species of marmalade is commonly made in France from apricots, peaches, plums, and pears.

MARMOLITE, n. *mâr'mō-līt* [Gr. *marmairō*, I shine; *lithos*, a stone]: a variety of foliated serpentine of a pale-green, yellow, or light-gray color.

MARMONT, *mâr-mōng'*, AUGUSTE FRÉDÉRIC LOUIS VIESSE DE, Duke of Ragusa and Marshal of France: 1774, July 20—1852, Mar. 2; b. Châtillon-sur-Seine. He entered the army at an early age, served as brigadier-general in Egypt, returned with Bonaparte to France, supported him in the revolution of the 18th Brumaire, and continued in active military service. Having defended the Ragusan territory against the Russians and Montenegrins, he was made Duke of Ragusa. He joined the great army 1809, the day before the battle of Wagram, was intrusted with the pursuit of the enemy, won the battle of Znaym, and was made a marshal. He was thereafter for 18 months governor of the Illyrian provinces; and 1811 succeeded Massena in chief command in Portugal, where he assumed the offensive, caused the siege of Badajoz to be raised, and kept Wellington in check 15 months. A wound compelled him to retire to France. In 1813, he commanded a *corps d'armée*, and fought at Lützen, Bautzen, and Dresden. He maintained the contest with great spirit in France in the beginning of 1814; and it was not until further resistance was hopeless that he concluded a truce with Barclay de Tolly, on which Napoleon found himself compelled to abdicate. The Bourbons loaded Marmont with honors. On the return of Napoleon from Elba, he was obliged to flee. After the second restoration, he spent much of his time in agricultural pursuits, till the revolution of 1830, when, at the head of a body of troops, he endeavored to reduce Paris to submission, and finally retreating with 6,000 Swiss, and a few battalions that had continued faithful to Charles X., conducted him across the frontier. From that time he resided chiefly in Vienna. In 1852, he engaged in an effort for the fusion of the French Legitimists and Orleanists, but died at Venice early in that year, last survivor of the marshals of the first French Empire.

MARMONTEL, *mâr-mōng-tĕl'*, JEAN FRANÇOIS: elegant French writer: 1723, July 11—1799, Dec. 31; b. Bort, in the Limousin; of an obscure family. He studied for the priesthood, but turned aside to literature, and after obtaining reputation in Toulouse as a poet, he went to Paris on invitation from Voltaire 1746. Here he wrote tragedies and operas with no great success, but was fortunate enough to get a secretaryship at

Versailles, through the influence of Madame Pompadour, 1753. Afterward, he received a more lucrative appointment, the *Mercure* being intrusted to his charge. His *Contes Moraux* (2 vols. Par. 1761), part of which appeared originally in the *Mercure*, have been translated into many languages, but are liable to the charge of monotony. He wrote other works, the most celebrated of which is his *Bélisaire*, political romance, containing a chapter on *toleration*, which excited the most furious hostility on the part of the doctors of the Sorbonne. The book was condemned as 'heretical and blasphemous,' the clergy declaimed against it from the pulpits; the city was in a ferment; even the wise Turgot was borne away by the current. Pamphlets, epigrams, caricatures, appeared in great numbers. There was a contest between the philosophers and wits on the one hand, and the theologians on the other; but the latter were defeated, and M. was named historiographer of France. In 1787, appeared *Eléments de Littérature*, consisting of his contributions to the *Encyclopédie*, in which he had charge of the departments of poetry and general literature. It is really his best book, and the one on which his reputation most securely rests. After the Revolution, he retired from the Reign of Terror to the village of Abloville, near Evreux; and d. near Gaillon, dept of Eure. An ed. of his *Œuvres Complètes* was published by himself, 17 vols.; another, 18 vols. (Par. 1818); a third, 7 vols. (Par. 1819–20).

MARMORA, *mâr′mo-ra*, THE SEA OF (the *Propontis* of the ancients): small sea between European and Asiatic Turkey, communicating with the Ægean Sea by the Strait of the Dardanelles (q.v.—anciently *Hellespont*), and with the Black Sea by the Strait of Constantinople or the Bosporus (q.v.) or Bosphorus. It is of oval form, about 135 m. in length by 45 in breadth, but has besides a large gulf, the Gulf of Ismikmid or Ismid, which extends about 30 m. e. into Asia. The depth is great. There is a current from the Bosporus through it and the Hellespont to the Archipelago; but its navigation is not difficult. It contains many islands, of which the largest is Marmora or Marmara, famous for quarries of marble and alabaster. The scenery around the Sea of M. is soft and beautiful.

MARMORACEOUS, a. *mâr′mō-rā′shŭs* [L. *marmor* or *marmŏrem*, marble]: pert. to or like marble. MAR′MORATE, a. *-rāt*, inclosed in marble; marbled. MAR′MORA′TUM, *-rā′tŭm* [L. incrusted with marble]: a cement or plaster of marble-dust and lime.

MARMOSE, n. *mâr′mōs*: an animal resembling the opossum, but less in size.

MARMOSET, n. *mâr′mō-zĕt* [F. *marmouset*, a queer little figure, a little monkey—from mid L. *marmŏrētŭm*, made in marble—from L. *marmor*, marble, later a little marble figure also: *marmoretum* was applied to the spouts of cisterns and drinking-fountains generally formed in grotesque marble figures]: term applied to a number of spe-

cies of small and beautiful S. Amer. monkeys of genera *Hapale* and *Jacchus*, called also OUISTITI; also sometimes to species of the genus *Midas* of naturalists. They all are distinguished from the other American monkeys by the smaller number of their grinders, resembling in this the monkeys of the old world, also by the sharpness and crookedness of their nails. They depart from the true quadrumanous character in having the thumb not opposable. The tail is very long, and thickly covered with hair, but not prehensile. They have a very affectionate

Marmoset, or Striated Monkey (*Hapale Jacchus*).

disposition; but unhappily all of them prove very delicate when removed from a warm climate. The name M. is sometimes restricted to the species called also the STRIATED MONKEY, or STRIATED OUISTITI (*Hapale Jacchus*, or *Jacchus vulgaris*), native of Guiana and Brazil, a species often brought to Europe, and a favorite pet whenever it can be obtained. It is about seven or eight inches long, exclusive of the tail, which measures a foot. Its fur is long and soft, of fine dark gray or reddish-yellow color, banded with black; a long tuft of white hairs on each side of the black head.

MARMOT, n. *mâr'mŏt* [F. *marmotte*—from It. *marmotto*], (*Arctomys*): genus of rodents, ranked usually among the *Muridæ*, but regarded as a connecting link between that family and *Sciuridæ;* resembling squirrels in their dentition, though in form and habits they more resemble rats and mice. They have two incisors and two premolars in each jaw, four molars on each side above and three below.—The COMMON M., or ALPINE M. (*A. alpinus*), is a native of the Alps, the Pyrenees, and the northern mountains of Europe, up to the limits of perpetual snow. It is about the size of a rabbit, grayish yellow, brown toward the head. It feeds on roots, leaves, insects, etc.

it is gregarious, and often lives in large societies. It digs large burrows with several chambers and two entrances, generally on the slopes of the mountains, where

Marmot (*Arctomys alpinus*).

the marmots may be seen sporting and basking in the sunshine during the fine weather of summer. They spend the winter in their burrows, in one chamber of which is a store of dried grass; but the greater part of the winter is passed in torpidity. The Alpine M. is easily tamed. The Prairie Dog (q.v.) is allied to it; also the Woodchuck (q.v.) The QUEBEC M. (*A. empetra*) found in Canada and the more n. parts of America, in woody districts, is a burrowing but not a gregarious animal.

MARNE, *mârn*, river of France, *Matrŏna* of the ancients, the most considerable tributary of the Seine, on the right. It rises in the plateau of Langres, flows through the depts. of Haute-Marne, Marne, Aisne, and Seine-et-Marne, in a course at first n.w., then w., with many windings; passes Chaumont, Joinville, St. Dizier, Vitry, Châlons, Epernay, Château-Thierry, and Meaux; and joins the Seine at Charenton, about four m. above Paris. Its length is about 205 m., and it is navigable for 140 m. It is a rapid stream, in most places with a wide bed. Its commerce has been extended by canals; the most important, completed 1851, connects it with the Rhine.

MARNE: inland dept. in n.e. France, formed out of the old province of Champagne; traversed by the river Marne, and extending s. from the frontier dept. of Ardennes; 2,021,488 English acres, of which 1,519,320 acres are cultivable and 45,704 in vineyards. The soil is very fertile in the s., but chalky and arid in the north. In the dry and chalky soil of the n. of this dept. the best varieties of the famous Champagne (q.v.) wine are grown: 15,318,345 bottles of champagne were exported 1875. Of wines of all kinds, about 15,400,000 gallons are produced annually. The rearing of a Spanish breed of sheep is a chief industry, and woolen manufacture is extensive. The dept. is divided into the 5 arrondissements, Châlons-sur-Marne, Epernay, Reims, Sainte-Ménéhould, Vitry-le-François.; cap., Châlons-sur-Marne. Pop. M. (1881) 421,800; (1891) 434,692; (1901) 432,882.

MARNE, Haute: inland dept. in n.e. France, s.e. of the dept. of Marne; 1,545,460 acres. The surface is generally hilly, and mountainous in the s. and east; more than one-half is cultivable, and about one-third is in forests. The principal rivers are the Marne, with its tributaries, and the Meuse. About 13,000,000 gallons of wine of ordinary quality are produced. The dept. is rich in iron ore; there are numerous furnaces, and the production of iron is the principal industry. There are three arrondissements, Chaumont, Langres, and Vassy; cap. Chaumont-en-Bassigny.—Pop. of dept. (1881) 254,876; (1891) 243,533; (1901) 226,545.

MAROCCO: see Morocco.

MAROCHETTI, *mâ-ro-kĕt'tē*, Carlo, Baron, Chevalier of the Legion of Honor: Italian sculptor: 1805–67; b. Turin. After primary studies at the Lyceum Napoléon, he entered Bosio's studio; and after a tour through Italy, he took up his abode in France 1827, and received a medal the same year for his beautiful statue *A Young Girl Sporting with a Dog.* In 1831, he exhibited the *Fallen Angel.* On the outbreak of the Paris revolution of 1848, M. went to reside in London, where he met splendid encouragement from the public and a host of royal and noble patrons. Among his best works are an equestrian statue of Emmanuel Philibert, executed gratuitously for his native city of Turin; the tomb of Bellini, in Père la Chaise; grand altar in the Madeleine at Paris; statues of the Emperor, the Duke of Orleans, and Queen Victoria; colossal figure of Richard Cœur-de-Lion, exhibited at the portal of the Crystal Palace. One of his last works was a statue of Lord Clyde in Waterloo Place, London.

MARONE, n. *ma-rōn'* [from *maroon*, a color]: one of a class of impure colors, composed of black and red, black and purple, or black and russet pigments, or with black and any other denomination of pigments in which red predominates. Marone' lake, a preparation of madder, of great depth, transparency, and durability of color.

MARONITES, n. plu. *măr'ō-nīts*: a Christian tribe of the Lebanon, Syria, of very ancient origin, regarding which considerable controversy has arisen. The most probable account represents them as descendants of a remnant of the Monothelite sect (see Monothelism) who, fleeing from the repressive measures of Emperor Anastasius II., early in the 8th c., settled on the slopes of the Lebanon, their chief seats being around the monastery of Maron, a saint of the 5th c., whose life is found in Theodoret's *Religious Histories* (iii. 1222). The emigrants are said to have elected as their chief and patriarch a monk of the same name (Maron—from whom, it is thought, they were named), with the title Patriarch of Antioch, and throughout the political vicissitudes of the succeeding centuries, to have maintained themselves in independence among the Moslem conquerors. In the

12th c., on the establishment of the Latin kingdom of Jerusalem, the M. abandoned their distinctive monothelite opinions, and recognized the authority of the Roman Church. Again, in the Council of Florence, 1445, they entered into a formal act of union with Rome. In 1584, a college was founded in Rome for the education of the Maronite clergy; and 1736, they formally subscribed the decrees of the Council of Trent. Nevertheless, though united with Rome, they are permitted to retain their distinctive national rites and usages. They administer communion in both kinds; they use the ancient Syriac language in their liturgy; their clergy, if married before ordination, are permitted to retain their wives; and they have many festivals and saints not recognized in the Roman calendar. The M. at present are about 150,000 in number, distributed into 150 parishes. Their patriarch is still styled Patriarch of Antioch, and resides in the convent of Canobin on the Lebanon. He acknowledges the supremacy of the pope, and is bound to lay before him every tenth year a report of the state of his patriarchate. Under him are 17 bishops, to whom are subject the officiating clergy of the 150 districts alluded to above. The revenues of all orders of ecclesiastics, however, are very narrow, and the inferior clergy live mostly by the labor of their hands. The numerous convents for both sexes contain 20,000 to 25,000 members, who all wear a distinctive costume, but follow the rule of St. Anthony. The chief seat of the M. is the district called Kesrawan, on the w. the declivity of Mount Lebanon; but they are scattered over the whole territory of the Lebanon, and in all the towns and larger villages toward the n. in the direction of Aleppo, and s. as far as Nazareth. Their political constitution is a kind of military republic, regulated for the most part by ancient usages and by unwritten, but well-recognized laws. Like the Arabs of Syria, they have a political hierarchy, partly hereditary, partly elective. The chief administration is vested in four superior sheiks, who possess a sort of patriarchal authority; and under these are subordinate chiefs, with whom, as in the feudal system, the people hold a military tenure. They retain even still a custom similar to that of the Sardinian *vendetta*, by which the kindred of the slain are bound to avenge his death. For relations of the M. with the Druses, see DRUSES. By an arrangement adopted since the recent sanguinary conflicts, both populations alike are subject to one gov. appointed by the Porte as gov. of the Lebanon.

MAROON, a. *ma-rôn'* [F. *marron*, chestnut-colored—from *marron*, a large French chestnut: It. *marrone*, the largest kind of chestnut]: brownish crimson; of a claret color.

MAROON n. *mă-rôn'* [F. *marron*—from Sp. *cimarron* or *simaron*, a runaway slave—probably from *sima*, a cave or from *cima*, mountain top]: name given in Jamaica and Dutch Guiana to runaway negro slaves, or slaves who take

to the woods. The term was applied first to slaves deserted by their masters, the Spaniards, when the British conquered Jamaica (1655), and who took refuge in the uplands, where for 140 years they maintained constant warfare with the British colonists; but 1795 they were subdued, and a portion of them removed to Nova Scotia, and afterward to Sierra Leone. The remnant fraternized with their manumitted brethren in 1834-5. Maroon is now almost a proper name for the descendants of these early fugitive negroes. The Maroon of Dutch Guiana form a number of small independent communities. MAROON, v. to put a sailor ashore on a desolate island by way of punishment. MAROON'ING, imp. MAROONED', pp. *-rônd.*

MAROS-VASARHELY, *mŏr'ŏsh-vâ'shâr-hĕly':* market-town of Austria, in Transylvania, in a fruitful district, on the Maros river (350 m. long, tributary of the Theiss), 55 m. n.n.e. of Hermanstadt. It contains a strong castle, a beautiful Gothic church (Reformed); other churches, Rom. Cath. and Greek orthodox, a Calvinistic college, and a public library of 80,000 vols. Tobacco, wine, and fruit are extensively grown. Pop. 20,000.

MAROT, *mâ-rō',* CLEMENT: earliest of the distinctively modern French poets, an important figure in French literature: 1496 (or 7)—1544; b. Cahors; of a Norman family. He entered the service of Francis I.; and 1519 was attached to the suite of Margaret d'Angoulême, the king's sister. In the battle of Pavia he was wounded and taken prisoner, but on his return to Paris became a member of the royal household. Imprisoned once as a Prot. heretic, and coming again into serious risk, he fled to Navarre and to Italy; returning, he had to flee finally 1543. Being as much a freethinker as a Calvinist, he found no shelter in Geneva, whither first he betook himself, and went to Turin, where he died. His early poems are stiff; his later ones are almost unsurpassed for ease and grace, in which qualities his only rival is La Fontaine. He wrote many rondeaux, epigrams, epistles, and ballads; also the poem *L'Enfer.* His famous translation of the Psalms in poetry—superior to the inadequate French prose translation of the Scriptures at that time—did much to promote the Reformation, and was sung at the court, and was widely popular in the country.

MAROZIA, *mâ-rŏt'se-â:* Roman lady: b. near the close of the 9th c.; d. 938; of noble family, but of infamous reputation in the scandalous chronicles of her age; daughter of the equally notorious Theodora. At the time of the dissolution of all the moral ties of public and private life which the war of factions occasioned in Rome, in the 10th c., Marozia, by her beauty and her intrigues, contrived to exercise great influence. She was married three times, and, if we may credit the narrative of Luitprand, had skill and address enough to procure the deposition and death of the pope, John X., and the

elevation of her son, the fruit, it is alleged, of adulterous intercourse, to the pontificate, under the name of John XI. This, however, rests on the testimony of Luitprand, who wrote some time after the period, and whose authority is considered more than doubtful, not merely by Muratori, but also by critical and unbiassed writers. Marozia's later years brought on her the punishment of her crimes, and she died in prison at Rome.

MARPLOT, n. *mâr'plŏt* [*mar*, and *plot*]: one who spoils or mars a design by officious interference or meddling.

MARQUE, n. *mârk* [OF. *marque*, a boundary, a catching within one's borders—from *marquer*, to catch within one's borders, to pillage: mid. L. *marcha;* F. *marque*, the authority given by a prince to any of his subjects to do himself right in a border quarrel by seizing the property or persons of the countrymen of the wrong-doer (see MARCHES)]: now used only in LETTERS OF MARQUE, a license or commission granted by a sovereign to the commander or owner of a private vessel in time of war to seize the ships of his enemy; the ship so commissioned is usually called a *privateer*. See LETTERS OF MARQUE.

MARQUEE, n. *mâr-kē'* [F. *marquise*, the tilt over a tent]: a large field tent; *literally*, the tent of the *marquis* or *marchioness*.

MARQUESAS ISLES, *mâr-kā'sâs*, or MENDAÑA ISLANDS, *mĕn-dân'yâ* (French, *Les Marquises*): group of five islands in Polynesia touched by the meridian of 140° w. The name strictly applies to four or five islands discovered by Alvaro Mendaña 1595, and called Marquesas after the viceroy of Peru, the *Marquis* de Mendoza; but usually includes now also the Washington group of seven islands, to the northwest; whole extent s.e. to n.w. more than 200 m.; 489 sq.m. The whole archipelago is volcanic, and covered with verdure. The climate is hot and moist, but healthful. The flora resembles in general that of the Society Islands. The principal food productions are pulse, yams, cocoanuts, sugar-cane, cotton, and bamboos; hogs also are numerous. The men are well-formed, active, powerful, and all tattooed. The women have regular features, good complexions, fine teeth, and neat hands, and are the finest of the sex to be met with in Polynesia. The people of these islands were formerly cannibals, and though this practice has been discontinued cruelty and ferocity are prevailing characteristics, and the efforts of the missionaries have met with but little success. The principal island of the Marquesas proper is Hiva-oa, 22 m. long, 10 m. wide. Since 1842 the islands have been under a French protectorate little more than nominal. Pop., said to have been 20,000, has fallen to about 4,500.

MARQUESS, n. *mâr'kwĕs* [F. *marquis*]: now a common spelling of MARQUIS, which see.

MARQUETRY, n. *mâr'kĕt-ri* [F. *marqueterie*—from *marqueter*, to checker, to inlay—from *marque*, a mark]: ornamental inlaid work on wood; kind of mosaic—also the art of making it—executed in hard and curiously grained wood, and other material, inlaid and arranged in great variety of patterns. See BUHL; INLAYING; MOSAIC.

MARQUETTE, *mâr-kĕt'*: Mich., city, county-seat of Marquette county; on Lake Superior, and on the Duluth, S. S. & A., and the Lake Superior & I. railroads; about 58 miles north by west of Escanaba, on Lake Michigan. The first permanent settlement was made in 1899 after public accounts had been given of the mineral wealth of the Upper Peninsula. It was incorporated in 1851 and chartered as a city in 1869. It was named after Père Marquette (q.v.), who had visited this section as a missionary to the Indians. It has a fine harbor with a breakwater 3,000 feet in length, and the best of facilities for loading steamers with the minerals, especially iron ore, which are shipped from here in large quantities. The ore docks are the largest and best fitted of any in the country. It has steamer communication with all the important lake ports. Near the city are large quarries of brown stone, which furnish employment to a number of people. The chief industrial establishments are a planing-mill, two blast furnaces, steam-engine works, and the stone quarries, all employing about 800 men. Other smaller industries are the manufacturing of furniture, sash, doors, and blinds, and bricks. The principal buildings are a government building, which cost $150,000; a county court-house, cost $250,000; Peter White Library —the building cost $75,000, and the 15,000 volumes are valued at $30,000; a city hall, cost $60,000. The educational buildings are a State Normal School, which cost $150,000; eight public schools, cost $500,000; a manual training school; and Saint Joseph's Academy. It has Protestant Episcopal and Roman Catholic cathedrals, Saint Mary's Hospital, the Upper Peninsula State Prison, and a House of Correction. The Federal government presented to the city Presque Isle, about 400 acres, a short distance north of the city proper. The place has been improved and made into a beautiful park. A statue of Père Marquette is in a city square, near the shore. The three banks have a combined capital of $400,000, and the annual business amounts to $7,500,000. The government is vested in a mayor and a council of 16 members who are elected annually. The electric-light plant and waterworks are owned and operated by the city. Pop. (1900) 10,058; (1910) 11,503.

MARQUETTE, *mâr-kĕt'*, JACQUES: 1637—1675, May 18; b. Laon, France. At 17 he entered the Society of Jesus; 1666, was ordained priest and sailed for Canada as missionary, landing at Quebec; spent more than a year near Three Rivers learning several Indian languages. 1668, Apr., he met some Indians at Montreal, with whom

he went to Lake Superior and founded the mission of Sault Ste. Marie; 1669, he was ordered to La Pointe, to take the place of Allouez there. Thence he went with his Hurons to Mackinaw, where, 1671, he built a chapel. In 1673, he went with Louis Joliet (q.v.) and five Frenchmen, to explore the course of the Mississippi, starting from Green Bay in two canoes, down the Wisconsin, and then down the Mississippi to within two or three days' journey from its mouth, when fear of the Spanish caused them, July 17, to start on their homeward journey. They passed up the Illinois river instead of the Wisconsin, and arrived home at Green Bay 1674, Sep., having travelled 2,500 m. in their open canoes. 1675, Mar. 30, after untold hardships on the journey, he reached Kaskaskia, Ill., and established a mission there. Conscious of his approaching end, he soon set out on his return, intending to go back to Mackinaw; but he came no further than the small river whose mouth is on the e. shore of Lake Michigan, and which is named after him; there he died in presence of his two French companions; and there they buried him, erecting a bark cabin over the grave. In 1677, his body was taken to Point St. Ignace, Mich., and buried under the floor of the chapel there, where it lay forgotten until discovered, 1877.

MARQUIS, n. *mâr'kwĭs,* or MARQUESS, *-kwĕs* [F. *marquis*—from OF. *marchis*—from mid. L. *marchensis,* a governor set over the marches or frontiers of the empire —from mid. L. *marcha;* O.H.G. *marcha,* a march, a boundary; It. *marches:* comp. Ger. *markgraf,* originally count of the *marches* or border territories]: title and rank of nobility second in the English peerage, being next below that of duke: fem. MARCHIONESS. Marquises were originally commanders on the borders or frontiers of countries, or on the sea-coast, which they were bound to protect. In England, the title was used in this sense as early as the reign of Henry III., when there were marquises or lords-marchers of the borders of Scotland and Wales; and the foreign equivalent *Markgraf* was common on the continent. The first English marquis in the modern sense was Robert de Vere, Earl of Oxford, who was created Marquis of Dublin by Richard II. The oldest existing marquisate in England is that of Winchester, created by Edward VI. 1551. The coronet of a marquis, in the United Kingdom, is a circle of gold, with four strawberry leaves (or oak leaves), and as many pearls alternating with them, and placed on pyramidal points of the same height with the leaves. The mantle is scarlet, with three and a half doublings of ermine. A marquis is styled 'The Most Honorable;' his wife is a marchioness; his eldest son takes by courtesy the next lower title in the peerage. The younger sons of a marquis are styled 'Lord,' and daughters 'Lady,' with the addition of Christian name and surname. MAR'QUISATE, n. *-kwĭz-āt,* the dignity or lordship of a marquis.

MARRIAGE, n. *măr'rĭj* [F. *mariage*, marriage—from mid. L. *maritaticum*: F. *mari*; L. *marītus*, a husband (see MARRY)]: the contract or ceremony by which a man and woman become husband and wife; wedlock, the state created by the marriage contract. MARRIAGEABLE, a. *măr'rĭj-ă-bl*, of an age suitable for marriage. MAR'RIED, a. *-rĭd*, united in marriage; wedded. MARRIED WOMAN: see HUSBAND AND WIFE. SYN. of 'marriage': wedding; nuptials; matrimony.

MARRIAGE: union of a man and a woman in the legal relation of husband and wife—including both the act that creates the union, and the union itself as the resulting state. This in one form or another is the oldest institution of society and the source of its most ancient laws. Society indeed could not long exist without some rules imposed by necessity for the appropriation of men and women to one another, securing them in the enjoyment of one another's society, and defining their obligations to their children. According to the law or practice of the greater part of the civilized world, one man marries one woman at a time—which Christ declares to be according to the fundamental law of God given in the institution of M. at the creation of man. This reference of M. to the highest conceivable origin, which has an essential relation to the characteristically Christian purification of it, the Apostle Paul develops for guidance in the practical duties of the wedded state—bringing to light the formative principle of wedlock as the great earthly symbol of the sacred 'mystery' of the union of the Son of God with humanity: 'For this cause (i.e., since the Son of God left the Father that He might join Himself with our flesh) shall a man leave his father and mother, and shall cleave to his wife; and the twain shall become one flesh' (see Eph. v. 22–33; also Gen. ii. 18, 24; Matt. xix. 5, 6; Mk. x. 7, 8; Col. iii. 18, 19). The Mormon heresy on this subject is now being suppressed by statute. But this familiar system of monogamy is a comparatively recent development of marriage. With those who reject the Christian records, a great diversity of opinion exists as to the particular form of primitive marriage. It is conceivable that many forms may have very early been introduced. Polygynia and polyandria—one man with many wives, one wife with many husbands; these have certainly existed. By a recent writer on the subject (Morgan, *Systems of Consanguinity and Affinity*, 1871; and *Ancient Society*, 1877) it is asserted that intercourse was originally promiscuous. This negation of M. is vehemently disputed, and with excellent reason. Morgan also affirms a primitive custom of intermarriage between brothers and sisters; the consanguine family of the Malay civilization; and a custom of intermarriage of several sisters with each other's husbands, and of several brothers with each other's wives. This custom is said to result in the formation of a *gens*, governed in its marriage relations by the principle of exogamy—viz., selection of wives out-

side the *gens:* after this comes the marriage of single pairs with or without exclusive habitation. It is more accordant with such evidence as is possessed to speak of these related customs as ancient; it is impossible to prove the earliest of them primitive, i.e., the original custom. The patriarchal family was largely polygamous; and after that period true monogamy does not appear in any general development before the rise of private property, lineal succession, and slavery. (See on this subject, M'Lennan, *Primitive Marriage*, 2d ed.; Tylor, *Early History of Mankind;* Lubbock's *Origin of Civilization;* Bachofen, *Das Mutterrecht.*) The primitive ceremonies of M. are of immense number, and some of striking beauty: those which have left the most distinct survivals in modern custom are sale and capture. As regards Christian Europe, in 1085 Hildebrand declared M. a sacrament of the church; and at the Reformation, Calvin declared it an institution of God. The school of Grotius described it as a contract of partnership. Throughout Christendom, M. is generally accompanied by a religious ceremony. In the eye of the law, even where the intervention of a minister of religion is on public grounds declared essential, M., considered as the act that forms the union, is a contract. The varieties of M. as a modern legal institution are well summarized in Bergson's Introduction to *Concordance entre les Codes Civils* (Paris 1856.) While the law thus deals with M. as a contract, there has been and is much controversy whether it is really a contract; and if so, then of what class of contracts. For though consent of the parties—one chief element in all contracts—is universally a requisite to a legal M., yet all the incidents of the condition which the act of consent constitutes are fixed by positive law. Some confusion of thought may be due to the use of the term M. to denote both the contracting act and the *status* which that act creates. In the United States, on the ground that the constitution forbids any state from 'impairing the obligation of contracts,' it has been decided that M. is not a contract within the meaning of the constitution. The peculiar relation of the states to the federal government occasions difficulty at this point (see Bishop, *Marriage and Divorce*). The law, leaving the question open whether M. is only a contract, or a contract and more—also the question whether it is a merely civil act or a combined civil and religious act—deals with it only practically as it creates the legal status of husband and wife. It has been pointed out, however, that though M. is legally termed a contract, it is invariably distinguished from all other contracts, e.g., that of master and servant, landlord and tenant; inasmuch as that in all the others the parties assign rights and duties generally at their own choice, while in M. the law determines all the rights and duties which are elements in the new relation formed.

For rights, duties, disabilities, and liabilities pertaining to M.—also for its effect on property rights, see

HUSBAND AND WIFE: for rights connected with the dissolution of M., see DIVORCE: JUDICIAL SEPARATION.—Various modes of constituting M. are now to be indicated.

England.—To insure deliberation and to preserve indisputable evidence of so important a fact, English law makes certain forms essential to marriage. A breach of the contract to marry gives rise to an action of damages (though this remedy is being gradually condemned by public opinion); but M. itself will not be set aside and treated as null merely because either party procured it by fraudulent representations. M. cannot be rescinded by either party or both at pleasure, though that effect is brought about in another way by certain kinds of misconduct, whether studied or not, of either party; see DIVORCE: JUDICIAL SEPARATION. Another feature in which M. differs from other contracts is, that it cannot be entered into in a moment, but certain preliminary notices must be given, and forms gone through. Since 1836 persons have the option of two forms of contracting M.: it may be with or without a religious ceremony; and if with a religious ceremony, it may be either in the established church or in a dissenting chapel. If the M. is to take place in an established church, there must be publication of banns of M. for three preceding successive Sundays, either after the Second Lesson or during the communion office; but a M. license obtained from the ordinary of the district, or a special license from the archbishop, will dispense with banns; 15 days' previous residence in the parish by one of the parties being necessary. A registrar's certificate, obtained on seven days' residence and 21 days' notice, also will dispense with banns, but an established church clergyman is not bound to marry on this. The M. must take place in the church, the M. service of the Church of England being read over, and this must be done in canonical hours—i.e., between 8 and 12 A.M., in presence of two witnesses. If the M. is celebrated in a dissenting chapel (and for that purpose such chapel must be duly licensed and registered) a certificate or license must be got after notice from the registrar; and there must be present the registrar of the district as one of the witnesses, except in Quaker and Jewish marriages. If the M. is not with any religious ceremony, it must take place in the office of the supt.-registrar, and in presence of witnesses; both parties in the presence of witnesses there exchanging a declaration that they take each other for man and wife. The canonical hours must be attended to in all cases. The omission of any of these requisites with the knowledge of the parties, makes a M. void. It is felony to celebrate a M. in a private house, unless by special license from the archbishop. And in all cases the fact of the M. must be entered in a church register, also in a civil register; the latter being ultimately filed and kept in Somerset House, London, where a copy of the certificate of registration can be had for a small sum. The guilt of perjury is incurred by making or signing a false declaration on giving notice to

the officer. In the case of the M. of an infant—i.e., a person under 21 years of age—evidence of the consent of parents or guardians has to be produced to the registrar or other officer: there are penalties for false representation as to such consent; but the lack of consent of parents or guardians does not make a M. null. It may sometimes happen that persons go through the form of M. and yet are not married; as where one of the parties is already married, the spouse being alive. In such case, it is quite immaterial whether the party so re-marrying is really ignorant that his or her spouse is alive, provided the spouse is living; for though, after seven years, if nothing has been heard of one of two married parties, the other will escape the penalties of bigamy on marrying again, yet it depends entirely on whether the first spouse is really dead at the time, whether the second M. is valid. Other instances where the M. is void, though the ceremony is complete, are where the persons are related to each other within the forbidden degrees of consanguinity and affinity; where either of them is under age, or of unsound mind, or physically disqualified. As regards members of the royal family (except the issue of princesses married into foreign families), they must either get the sovereign's consent, or give 12 months' notice to the privy council, subject to objection from both houses of parliament. M. betwixt a divorced party and the adulterer is lawful in England. But no clergyman of the established church can be compelled to marry any person whose previous M. has been dissolved on the ground of adultery.

The marriages of Quakers and Jews are subject to a peculiar legislation. They need not be in a registered building, and the registering officer of the Quakers, or the sec. of the Jewish synagogue, is authorized to be present instead of the registrar.

Scotland.—In Scotland, the principle of the civil law, *consensus non concubitus facit matrimonium*, has been adopted; and this consent can be proved either by a regular ceremony *in facie ecclesiæ* publicly recorded, or in three other modes known to the law. The chief impediments to this consent are nonage, insanity, impotency, relationship within the prohibited degrees, subsisting M., and adultery in the case of the adulterers. Also, if force has been used; or where an error as to the woman's chastity has been caused by her misrepresentation or concealment; or a mistake of personal identity occurs; or where a fraudulent conspiracy has been formed, the M. is null. The three other modes above referred to, for proving consent, beside that of the regular ceremony, are known as irregular marriages: they are constituted by a consent, which is proved by a written or verbal declaration of interchange of consent *per verba de præsenti;* or by a promise to marry, on the faith of which intercourse has followed (these facts, according to one opinion, requiring to be proved by a decree of declarator); or by cohabitation and habit and repute.

Proclamation of the banns in the parish church is required for regular M.; though, by certain formalities, a certificate may be procured from the registrar which will be sufficient authority for a minister, clergyman, or a priest to celebrate a regular M., just as if it were a certificate of proclamation of banns. No minister of the established Church of Scotland, however, is obliged to celebrate a M. not preceded by proclamation of banns. Where objection is made to the M., relative to a legal incapacity to marry, or a legal impediment to M., the registrar is forbidden to issue a certificate until he sees the judgment of a court of law disposing of the objection.

United States.—The law of M. in the United States is far from being settled; it is now, and for some time past has been, in a transitory condition.

The definition of M. by jurists in the United States differs from the Roman Church definition which elevates it to a sacrament; also from the definition which makes M. nothing more than a civil contract. In the United States, in the language of Judge Story, 'it is more than a contract; it is an institution founded upon the consent and contract of the parties, and has peculiarities in its nature, character and operation, different from what belongs to ordinary contracts.' This view of M., as something more than a mere contract, is peculiarly necessary in the United States, because of the numerous questions arising under conflicting laws relating to M. and divorce, in the different states.

Consent is the essence of a valid M. There can be no valid M. made by those who had not sufficient minds to consent, such as idiots or insane persons. So a M. procured by force or fraud may be set aside; or if another husband or wife of either of the parties be living, the M. is invalid; or if the parties are within the prohibited degrees of kindred, the M. is void. To make a valid M., each of the parties must have attained the age of consent; this varies in different states, ranging from 16 to 18 years in males and from 12 to 14 in females. The consent of parents or guardian to the M. of minors is required by the statutes of some of the states. Whether a M. without such consent would be absolutely void would depend largely upon the statute. Generally the M. would be held valid, though the person celebrating it might be punishable for abduction. The distinction between void and voidable M. still exists in the United States, though it has been modified by various statutes. A void M. is a nullity *ab initio*, and its validity may be impeached in any court, at any time. A voidable M. is valid until a competent tribunal has pronounced it void in direct proceedings to set the marriage aside. In most of the states, relationship within the prohibited degrees, and polygamy, render a M. void; and such causes as want of age, insanity or idiocy, physical disability, and fraud render a M. voidable. The effect of a M. being void or voidable is on the status of the par-

ties—when void the relationship is unlawful from the beginning; when voidable it is lawful until the M. is dissolved by the decree of a competent tribunal.

The M. acts in many of the states render certain solemnities indispensable in the M. celebration, though informal marriages have to a large extent been recognized in the United States. A present agreement between competent parties to take each other for husband and wife is generally regarded as constituting a valid M. Such a M., in a contest, becomes the subject of proof, and may be proved by actual cohabitation as husband and wife, acknowledgment, declarations, conduct, repute, reception among neighbors, and the like. But the words of the agreement must not be *verba de futuro;* such an agreement only gives a cause of action for breach of promise to marry. If an agreement in *verba de futuro* is followed by a consummation, a legal presumption is raised that words *de præsenti* afterward passed between the parties, and, unless this presumption is rebutted, the M. may be sustained.

The formal M. throughout all of the states consists in having the celebration take place before a clergyman or before some civil officer designated by statute. So far as forms and ceremonies are concerned, it is a general rule that the validity of the M. is to be determined by the law of the state in which it is solemnized.

In the United States, jurisdiction in all matrimonial causes is usually vested in courts of equity, or courts of equitable powers.

Within recent years the rules of the common law as to property rights of husband and wife have been largely changed by statutes. These statutes, familiarly known as 'the married women acts,' have been adopted to a greater or less extent in all of the states. By these acts married women have been empowered to hold real and personal property, with the same right and management, control, and disposition as unmarried women would have, to carry on business on their own account, for their own exclusive benefit, and to make contracts in relation to their separate property and the conduct of their business, which will be enforceable at law. And in most of the states married women may sue and be sued in their own name, without joining the husband; although in some states it is still necessary to join the husband in suing the wife in certain cases of tort.

During the cohabitation the law will, from that circumstance, presume the assent of the husband to all contracts made by the wife for necessaries which are suitable to the husband's degree and estate. Even though the husband be an infant, he is liable for necessaries furnished to his wife and children, their interests being considered as identified with his.

Contracts in restraint of M. are wholly void; e.g., a promise to a woman to marry no one but her.

See HUSBAND AND WIFE. JUDICIAL SEPARATION: DIVORCE: also MIXED MARRIAGES: MIXED RACES.

MARROT, n. *măr′ŏt:* a large aquatic bird; the auk.

MARROW, n. *măr′rō* [Icel. *mergr;* Dan. *marg;* Dut. *margh;* Ger. *mark*, marrow, pith: Icel. *mor*, lard; *meria*, to bruise]: the soft, fatty matter contained in the cavities of bones (see below): the pith of certain plants; the essence; the best part. MAR′ROWISH, a. *-ĭsh*, having the nature of marrow. MAR′ROWY, a. *-rō-ĭ*, full of marrow: MAR′ROWLESS, a. *-lĕs*, without marrow. MAR′ROW-BONES, bones boiled for their marrow; the knee or leg bones: MAR′ROW-FAT, a choice but late variety of pea. VEGETABLE MARROW, the fruit of the *Cucur′bĭtă ovĭf′ĕra*, a supposed variety of the common gourd, ord. *Cucurbĭtācĕæ*—so named from the softness of its fleshy substance; also called *egg-gourd.*

MARROW, n. *măr′rō* [Gael. *mar*, like; *maraon*, together]: in *Scot.* and *prov. Eng.*, a mate; a companion; one of a pair: V. to pair; to match: ADJ. similar; suitable. MAR′ROWING, imp. MARROWED, pp. *măr′rōd.* MAR′ROWLESS, a. *-lĕs*, without another to match.

MAR′ROW: substance of low specific gravity, filling the cells and cavities of the bones of mammals. There are two varieties, *watery marrow* and *oily marrow.* In some of the short bones, as the bodies of the vertebræ and the sternum, the marrow has a reddish color, and is found on analysis to contain 75 per cent. of water, the remainder consisting of albuminous and fibrinous matter with salts and a trace of oil. In the long bones of a healthy adult mammal, the marrow occurs as a yellow, oily fluid, contained in vesicles like those of common fat, which are imbedded in the interspaces of the medullary membrane, which is a highly vascular membrane lining the interior of the bones. This marrow consists of 96 per cent. of oil, and 4 of water, connective tissue, and vessels. The oily matter of the marrow is composed of the same materials as common fat, with the oleine (or fluid portion) in greater abundance. Being of low specific gravity, it is well suited to fill the cavities of the bones, and forms an advantageous substitute for the bony matter which preceded it in the young animal. Its special uses are not clearly known, but the fact that it loses much of its oil when the general nutritive powers fail, or when certain forms of disease attack the bone, shows that it serves some definite purpose in the economy.

MARROW CONTROVERSY: one of the most strenuous and memorable struggles in the religious history of Scotland, named from a book, *Marrow of Modern Divinity*, written by a Puritan soldier in the time of the Commonwealth. The highly 'evangelical' character of this work, and especially its doctrine of the free grace of God in the redemption of sinners, had made it a great favorite with the few zealous and pious ministers then found in the Church of Scotland: and 1718, an edition was published by the Rev. James Hog of Carnock, followed, 1719, by an explanatory pamphlet. The general assembly of the same year appointed a commission to look after books

and pamphlets promoting such opinions as are contained in the *Marrow*, and to summon before them the authors and recommenders of such publications. The committee, after examination, drew up a report, to the assembly of 1720; and the result was the formal condemnation of the doctrines of the *Marrow*, a prohibition of teaching or preaching them, and an exhortation (strong, but vain) to the people of Scotland not to read them. This act of the assembly was immediately brought by the celebrated Thomas Boston (q.v.) before the presbytery of Selkirk, which in turn laid it before the synod of Merse and Teviotdale. The 'evangelical' ministers in the church, few in number, but supported by considerable popular sympathy (for the *Marrow* by this time ranked next to the Bible in the regards of the religious portion of the Scottish peasantry), resolved to present a representation to the next general assembly (1721), complaining of the late act, and vindicating the 'truths' which it condemned. 12 ministers signed the representation—James Hog, Thomas Boston, John Bonnar, James Kid, Gabriel Wilson, Ebenezer Erskine, Ralph Erskine, James Wardlaw, James Bathgate, Henry Davidson, William Hunter, and John Williamson. These are the famous 'Marrow-men'—known also as the 'Twelve Brethren' and the 'Representers'—whose names were long held in veneration by the lovers of 'evangelical' religion. A commission of the assembly of 1721 was appointed to deal with the 12, and a series of questions was put to them, to which answers were drawn up by Ebenezer Erskine and Gabriel Wilson. These replies did not prove satisfactory, and the 'Marrow-men' were called before the bar of the assembly (1722), and solemnly rebuked. Nevertheless, as the assembly was not supported in its position by the religious sentiment of the nation, no further steps were taken in the matter; thus the victory virtually was with the evangelical recusants. It was, however, substantially the same controversy—though it did not go by the name—which, eleven years later, resulted in the deposition of Ebenezer Erskine, and the origination of the 'Secession' body. See BOSTON, THOMAS: ERSKINE, EBENEZER.

MAR'RUM: see AMMOPHILA.

MARRY, v. *măr'rĭ* [F. *marier*, to marry—from L. *maritārĕ*, to marry: F. *mari*; L. *marītus*, a husband (see MARRIAGE)]: to unite a man and woman as husband and wife; to give or dispose of in marriage; to enter into wedlock; among *seamen*, to splice ropes, that is, to interweave one end of a rope into that of another. MARRYING, imp. *măr'rĭ-ĭng*. MAR'RIED, pp. *-rĭd*: ADJ. united in marriage; wedded.

MARRY! int. *măr'rĭ:* a term of asseveration, from the Virgin *Mary;* by Mary! indeed! forsooth!

MARRYAT, *măr'ĭ-at*, FREDERICK: English sailor and novelist: 1792, July 10—1848, Aug, 2; b. London; son of a wealthy W. India merchant. On leaving school, he

entered the navy as a midshipman under Lord Cochrane. In 1812, he attained his lieutenancy, and was made commander 1815. While afloat, he saw much active service, established a high character for bravery, and was made a C.B. 1825, June. About 1830, he retired from the naval service, and wrote his first novel, *Frank Mildmay,* rapidly followed by those graphic and humorous pictures of sea-life which have taken a permanent place in every English circulating library. Marryat died at Langham, Norfolk; he was married, and left six children. The freshness of the new field was an acceptable surprise to the world of novel-readers; and Capt. Marryat's vividness of description, humorous portraiture, and wealth of incident commended his works to all classes. In 20 years of authorship he produced 24 vols.: the most popular are, perhaps, *Midshipman Easy, Peter Simple, Jacob Faithful, Snarley-yow, or the Dog Fiend,* and *Japhet in Search of a Father.* His fictions are full of adventure and broad humor—since Smollett's, no novels have caused so much laughter.—His daughter, Florence Marryat (b. Brighton, England, 1838, July 9; d. London, 1899, Oct. 27), published a long series of novels, and the *Life and Letters* of her father (1870).

MARS, n. *mârz* [L. *Mars,* god of war]: one of the smaller planets, situated between the earth and Jupiter, 141,000,000 miles from the sun. Its diameter is 4,200 miles. Its years contain 687 days. Its mean distance at opposition from the earth is 48,000,000 miles. The day on Mars is half an hour longer than ours, or about 24 hours and 37 minutes. It has two moons. It moves at the rate of 15 miles a second. Mars is the fourth planet from the sun, and is called the red planet, from its well-known color. The combination of its motion with ours causes it to pass behind us, or opposite to the sun, once in two years. For two months at this period it is best seen, and appears as a red lamp in the sky; at other times it looks small and unimportant. Its density and size are less than ours; a man weighing 200 pounds here would weigh but 75 pounds on Mars. The orbit of this planet is decidedly elliptical; it is 26,000,000 miles nearer the sun at the nearest part of its orbit than it is at the farthest, consequently the variation in heat from this cause alone is considerable. In many ways Mars resembles our earth; it has atmosphere, seasons, land, water, storms, clouds, and mountains. Snow and ice cover both its poles, and produce great white patches at those points, which are clearly seen through a large telescope; they are found to vary in size with the seasons, being largest during the Martian winter. The canals were first mapped in large numbers by Schiaparelli, although a few of them had been previously observed by other astronomers. They consist of narrow dark lines, generally straight, forming a network over the whole surface of the planet. At their junctions we often find small

black dots, known as lakes or oases. Large areas of the planet, called seas, are of a dark gray color, but most of the surface is yellow, or, if observed by daylight, orange. The cause of all the dark regions is probably vegetation, with the exception of the two very black lines which are seen to surround the snow caps when they are melting. These two lines are temporary in their nature, and form the only true oceans of the planet. Occasionally they attain a breadth in some places of 300 or 400 miles, and are then found to be of a dark blue color. The polariscope shows that, unlike the rest of Mars, their surfaces are shiny. The yellow regions are thought to be deserts. They cover more than half the entire surface. Very marked changes sometimes appear in the finer details when the snow is melting most rapidly. At the approach of the Martian autumn those parts of the dark areas that are near the poles are seen to fade out and turn yellow so as to be indistinguishable from the soil of the planet.

The moons of Mars were discovered by Asaph Hall in 1877. The outer and smaller one is probably less than 10 miles in diameter. The inner one revolves about the planet in seven hours and a half, apparently rising in the west, and goes through all its phases in a single night.

MARS, *mârz* [contraction of MAVERS or MAVORS; in the Oscan or Sabine language, MAMERS]: ancient Italian divinity identified by the Græcizing Romans with the Thracian-Hellenic *Ares*. Two conceptions of him are thus presented.

The Roman Mars, who as a war-god is surnamed *Gradivus* (= *grandis divus*, the great god), bore also the surname *Silvanus*, and appears to have been originally an agricultural deity; and propitiatory offerings were presented to him as the guardian of fields and flocks. He was god of the heavens, wielder of thunder, sender of rain, giver thus of fertility and increase. But as the fierce shepherds who founded the city of Rome were more addicted to martial than to pastoral pursuits, it is evident how easily in the course of time *Mars Silvanus* should have become the 'God of War.' Mars, who was a perfect personification of the stern, relentless, cruel valor of the old Romans, was held in highest honor. He ranked next to Jupiter; like him he bore the venerable epithet *Father* (Mars-*piter*); he was one of the three tutelary divinities of the city, to each of whom Numa appointed a flamen; he was even said to be the father of Romulus himself (by Rhea Silvia, priestess of Vesta), and was thus believed to be the real progenitor of the Roman people. He had a sanctuary on the Quirinal; and the hill received its name from his surname, *Quirinus*, the most probable meaning of which is *the spear-armed*. Under this designation he was invoked as the protector of the *Quirites* (citizens)—in other words, protector of the state. The

principal animals sacred to him were the wolf and the horse. He had many temples at Rome, the most celebrated of which was that outside the *Porta Capena*, on the Appian Road. The *Campus Martius*, where the Romans practiced athletic and military exercises, was named after him; so was the month of March (*Martius*), the first month of the Roman year. The *Ludi Martiales* (games in his honor) were celebrated every year in the circus, Aug. 1.

ARES, Greek god of war, was the son of Zeus and Hera; and the favorite of Aphrodite, who bore him several children. When Mars became identified with the Greek Ares in the Roman mind, he was regarded as almost equivalent to the warlike element in Jupiter, according to the imported tendency to consider Jupiter as the great and central god whose various special characteristics were represented by the other deities. He is represented in Greek poetry as a most sanguinary divinity, delighting in war for its own sake, and in the destruction of men. Before him into battle goes his sister *Eris* (Strife); with him are his sons and companions, *Deimos* (Horror) and *Phobos* (Fear). He does not always adhere to the same side, like the great *Athena*, but inspires now the one, now the other. He is not always victorious. Diomede wounded him, and in his fall, says Homer, 'he roared like nine or ten thousand warriors together.' Such a representation would have been deemed blasphemous by the ancient Roman mind, imbued as it was with a solemn Hebrew-like reverence for its gods. The worship of Ares was never very prevalent in Greece; it is believed to have been imported from Thrace. There, and in Scythia, were its great seats, and there Ares was believed to have his chief home. He had, however, temples or shrines at Athens, Sparta, Olympia, and other places. On statues and reliefs, he is represented as a person of great muscular power, and either naked or clothed with the chlamys.

MARSALA, *mâr-sâ'lâ*: large fortified seaport on the w. coast of Sicily, in a fruitful, well-cultivated district; a regularly built and pleasant town, with a college, a cathedral, a gymnasium, and several conventual establishments. It occupies the site of Lilybæum, anc. cap. of the Carthaginian settlements in Sicily, and was selected by Garibaldi as the landing-point of his volunteers in his famous Sicilian campaign 1860. It obtained its present name from the Arabs, who, when they held Sicily, esteemed this part so highly that they called it *Marsa Alla*, 'Port of God.' Its harbor is encumbered with sand, but its celebrated wines form an export trade of great importance, chiefly since 1802, when they were adopted by Lord Nelson for the use of the British fleet. 30,000 pipes of M. wine, which resembles sherry, are annually manufactured, two-thirds being exported. M. has also a large export trade in grain, oil, salt, and soda. Pop., commune (1871) 34,200; (1881) 40,250; town (1891) 34,202.

MARSALA, n. *mâr'sa-la:* a Sicilian wine, so named from the seaport whence exported.

MARSDEN, *mârs'dĕn*, SAMUEL: 1764–1838, May 12; b. England: Episc. missionary. He received a common-school education at Hull; engaged in mercantile business at Leeds; was a member of the Wesleyan Church till a desire for a collegiate education induced him to unite with the Church of England and enter St. Joseph's College, Cambridge; was ordained 1793; and in the following year accepted the appointment of chaplain to the new penal colony at Paramatta, Australia. Part of his salary was a grant of land and the use of a number of convicts to cultivate it. With these he soon established a model farm, used the profits to open schools and missions, and began training the convicts in industrial habits. Returning to England 1809, and failing to induce the Church Missionary Soc. to send missionaries to the New Zealand Maories, he prevailed on two laymen, William Hall and John King, to accompany him. At Australia he purchased a vessel, *The Active*, and in it visited New Zealand with his associates, and established a mission. He made seven visits to the Maories, and was largely instrumental in their remarkable Christianization and civilization.

MARSEILLAISE, or MARSEILLAISE HYMN, n. *mâr'sālyāz':* name by which the grand song of the first French Revolution is known. In the beginning of 1792, when a column of volunteers was about to leave Strasburg, the mayor of the city, who gave a banquet on the occasion, asked an officer of artillery, Rouget de Lisle, to compose a song in their honor: the result was the M.—both verse and music being the work of a single night. De Lisle entitled the piece *Chant de Guerre de l'Armée du Rhin.* Next day, it was sung with the rapturous enthusiasm characteristic of the French; and, instead of 600 volunteers, 1,000 marched out of Strasburg. Soon from the whole army of the north resounded the thrilling and fiery words *Aux armes, Aux armes;* nevertheless, the song was still unknown at Paris, and was introduced there by Barbaroux, when he summoned the youth of Marseille to the cap. 1792, July. It was received with transports by the Parisians, who—ignorant of its real authorship—named it *Hymne des Marseillais.*

MARSEILLES, *mâr-sâl'yĕh* or *mâr-sā'yĕh:* third largest city and chief seaport of France, chief port also of the Mediterranean; in the dept. of Bouches-du-Rhone, on the Gulf of Lyon, 410 miles in direct line s.s.e. of Paris, lat 43° 17′ n., long. 5° 22′ e. M. is a military place of the fourth class, and is defended by a citadel and other works; the roads are protected by the fortified isles of If (crowned by a castle, formerly a state-prison), Pomegue, and Ratonneau. Its harbor is formed by an inlet of the sea running eastward into the heart of the city, and covering nearly 70 acres. It has natural and artificial advantages, and can accommodate 1,200 vessels. The

new harbor consists of a series of docks or *bassins* (*de la Joliette, de l'Entrepôt, Napoléon, Impérial*), more than a mile long, with an area abt. 288 acres: other port accommodations make a total of 422 acres; but the 4½ m. of quays are inadequate for the immense annual traffic of more than 3,400,000 tons. Alongside the Bassins de l'Entrepôt and Napoléon are the bonded warehouses (cost $5,000,000), finest of the kind in Europe. From the margin of the old harbor, the ground rises on all sides, forming a kind of amphitheatre; and beyond the city proper the encircling hills, covered with vineyards and olive-gardens, are dotted with white country-houses. Immediately n. of the harbor is the old town, with its narrow streets, lined with high closely-piled houses; but through it a wide avenue, with branches, has recently been opened. South of the old harbor is the church of St. Victor, the most ancient in M.; and farther s. rises the rocky hill of *Notre Dame de la Garde*, with its church, held in the highest veneration by the sailors of the Mediterranean. At the foot of the hill is the wide promenade, Cours Bonaparte. Other fine promenades are Le Cours and Le Prado. The principal public buildings are the Hôtel de Ville, the museum, the public library with 78,000 vols., and the exchange. The *cafés* and shops of M. rival those of Paris in splendor. M. is the first commercial emporium of France. It has many soap-works, iron-manufactories, sugar refineries, etc. The large vessels and steamers annually entering its harbor number more than 8,600, tonnage more than 2,600,000. M. is directly connected by rail with Lyon, Toulouse, and Nice; and is the packet station for Italy and the East. The formerly barren country round M. has been of late greatly fertilized by the canal which supplies M. with water from the Durance: this aqueduct is 94 m. long, 15 m. under ground. During a portion of the year, the climate of M. is delightful, but in summer and autumn the heat is often intense. Cold, dry, and cutting winds from the n.e. render the climate at times exceedingly trying. In the environs are about 6,000 *bastides*, or country villas.

M. was founded by a Greek colony from Phocæa, in Asia Minor, about B.C. 600. Its ancient name was *Massalia*, written by the Romans *Massilia*. It was an important member of the ancient Greek community, planted numerous colonies along the n. Mediterranean shores, and introduced the germs of Greek civilization into Gaul. The Massaliots were long in intimate alliance with the Romans; but the city was at last taken by Julius Cæsar. In the 8th c. it was destroyed by the Arabs, and the maritime republics of Italy inherited the commerce of the Mediterranean, which formerly had been centred here. It was united, with the whole of Provence, to France in the reign of Charles VIII. In 1720, when it had again risen to importance, it was ravaged by a fearful epidemic, which swept away 40,000 of its inhabitants. Since 1830, the commerce and industry of the city have increased vastly. The conquest of

Algeria has brought increasing prosperity to Marseilles, and its n. African trade is now an important part of its commerce. Pop. (1891) 403,749; (1900) 491,161.

MARSH, n. *mârsh* [F. *marais*, a marsh—from OF. *maresc*—from mid. L. *mariscus:* OE. *mareis;* Dut. *maerasch;* It. *marese*, a marsh, a moorish or fenny place]: a tract of low land too wet for tillage; a fen. MARSHY, a. *mârsh'ĭ*, wet; fenny. MARSH'INESS, n. *-nĕs*, state of being marshy. MARSH-ELDER, the guelder-rose. MARSH-GAS, the fire-damp, or light carburetted hydrogen, evolved from marshes and stagnant pools (see METHANE). MARSH-HAWK (see HARRIER). MARSH-HEN (see RAIL). MARSH-TREFOIL, water-plant, called *Beg-bean*, or *Buck-bean* (q.v.).

MARSH, GEORGE PERKINS, LL.D.: philologist and diplomatist: 1801, Mar. 17—1882, July 24; b. Woodstock, Vt. He graduated at Dartmouth College 1820; studied law and practiced at Burlington, Vt.; was elected to the executive council of the state 1835, and to congress 1842 and 49. He was appointed U. S. minister at Constantinople 1849, and was charged with a special mission to Greece 1852. He travelled in n. Europe, and became adept in the Scandinavian languages. In 1861, he was appointed U. S. minister at Rome; and died in that office, at Vallambrosa. Dr. Marsh was an earnest and profound philological student. His most important works are a *Grammar of the Old Northern or Icelandic Language* (compiled 1838); *The Camel, his Organization and Uses* (1856); *Lectures on the English Language* (1861); *The Origin and History of the English Language* (1862); *Man and Nature*—largely re-written and issued under the title, *The Earth as Modified by Human Action* (1874).

MARSH, JAMES, D.D.: 1794, July 19—1842, July 3; b. Hartford, Vt.: Congl. minister, educator. He graduated at Dartmouth 1817; was tutor there 1818-20; graduated at Andover Theol. Seminary 1822; ordained 1824; professor of modern languages in Hampden-Sidney College, Va., 1824-26; president of the Univ. of Vt. 1826-33; and professor of moral and intellectual philosophy there 1833-42. He received his degree from Columbia 1830 and Amherst 1833. His literary work, which was large and important, included a series of papers to the *Vermont Chronicle* on *Popular Education*, under the pen name *Philopolis; a Preliminary Essay* in Coleridge's *Aids to Reflection* (Burlington 1829); *Selections from the Old English Writers on Practical Theology* (1830); and several translations from the German, including Herder's *Spirit of Hebrew Poetry*, 2 vols. (1823). See his *Remains*, with Memoir by Joseph Torrey (Boston 1843; 2d ed. 1845).

MARSH, OTHNIEL CHARLES, PH.D., LL.D.: naturalist: b. Lockport, N. Y., 1831, Oct. 29; d. New Haven, Conn.,

1899, Mar. 18. He graduated at Yale 1860; studied mineralogy and paleontology in the Sheffield Scientific School at Yale 1860-62, and zoology, geology, and mineralogy in the universities of Berlin, Heidelberg, and Breslau 1862-65; was appointed to the new chair of paleontology in Yale 1866, which he held till 1899; became paleontologist in charge of the division of vertebrate paleontology in the U. S. Geological Survey 1882; was elected president of the American Assoc. for the Advancement of Science 1878, and president of the National Acad. of Sciences 1883; and held membership in the chief American and European scientific societies. His great work was the investigation of the extinct animals of the Rocky Mountain region of N. America, in which he crossed the mountains more than 20 times, and discovered more than 200 fossil animals previously unknown. In 1876, he began preparing a series of monographs of his western discoveries for publication by the government, which comprise *Odontornithes, or Birds with Teeth* (Washington 1880); *Dinocerata* (1884); the dinosaurs of the order Sauropoda; the Stegosauria, reptiles; the Brontotheridæ; and others—all profusely illustrated. In 1875, he made a memorable exposure of the fraudulent treatment of the Indians, which led to the adoption of reformatory measures. In 1877, he received the Bigsby medal for paleontological discoveries from the Geological Soc. of London, of which he was a fellow; and 1886 received the degree PH.D. from the Univ. of Heidelberg and LL.D. from Harvard. In 1890, Jan., scientific circles in the United States were excited by the publication by Prof. Edward Drinker Cope, of the Univ. of Penn., of charges affecting the official and professional character of Maj. John W. Powell, director of the U. S. Geological Survey, and his chief assistant, Prof. Marsh. Prof. Cope charged Marsh with plagiarism and gross ignorance, and both Marsh and Maj. Powell with incompetence in the performance of their important public duties, and supported his charges with documentary evidence. This publication brought denials from Marsh and Maj. Powell, and counter charges against Prof. Cope. His will divided a considerable estate between National Acad. Sciences and Yale University.

MARSHAL, n. *mâr'shal* [mid. L. *mariscal'cus*, the master of the horse—from O.Ger. *mähre*, a horse; *schalk*, a servant: F. *maréchal;* OF. *mareschal*, one who shoes and takes care of horses]: *anciently*, officer under whose cognizance fell everything pertaining to the use of arms, the regulation of tournaments, etc.: a master of ceremonies; in *U. S.*, a civil officer of a district: V. to dispose or arrange in order. MAR'SHALLING, imp.: N. act of arranging in proper order. MAR'SHALLED, pp. *-shald:* ADJ. arranged in proper order. MAR'SHALLER, n. one who disposes in proper order. MAR'SHALSHIP, n. the office of a marshal. EARL-MARSHAL, in *Eng.*, the eighth

great officer of state, hereditary in the family of the Duke of Norfolk. FIELD-MARSHAL, highest military rank in the British army.

MAR'SHAL: a term, in its origin, meaning a groom or manager of the horse, though eventually the king's marshal became one of the principal officers of state in England. The royal farrier rose in dignity with the increasing importance of the *chevalerie*, till he became, jointly with the Constable (q.v.), the judge in the *Curiæ Martiales*, or courts of chivalry. An earldom is attached to the dignity, and the office of earl-marshal is now hereditary in the family of the Duke of Norfolk. When the king headed his army in feudal times, the assembled troops were inspected by the constable and marshal, who fixed the spot for the encampment of each noble, and examined the number, arms, and condition of his retainers. With these duties was naturally combined the regulation of all matters connected with armorial bearings, standards, and ensigns. The constable's functions were virtually abolished in the time of Henry VIII., and the marshal became thenceforth the sole judge in questions of honor and arms. The earl-marshal is president of the English College of Arms, and appoints the kings-at-arms, heralds, and pursuivants. The marshal's functions were formerly exercised in time of peace in the *Aula Regis* or King's Great Court, and on the division of the *Aula Regis*, he appointed deputies in the new courts; hence arose the offices of marshal of the king's (or queen's) bench and of exchequer, whose principal duty is to take charge of persons committed to their custody by the court. Besides the earl-marshal, there is a knight-marshal, or marshal of the king's (or queen's) household. The marshal or provost-marshal of the admiralty is an officer whose duty it is to act ministerially under the orders of the court of admiralty in securing prizes, executing warrants, arresting criminals, and attending their execution. The dignity of marshal existed formerly in Scotland, where a different orthography was adopted, and the office of marischal was hereditary in the family of Keith. In France, the highest military officer is called a marshal, a dignity which originated early in the 13th century. There was at first only one *Maréchal de France*, and there were but two till the time of Francis I. Their number afterward became unlimited. Originally, the marshal was the esquire of the king, and commanded the vanguard in war; in later times, the command became supreme, and the rank of the highest military importance. From the title of this class of general officers, the Germans have borrowed their feld-marschall, and we our field-marshal, a dignity bestowed on commanders distinguished either by elevated rank or distinguished service. See FIELD-MARSHAL, under FIELD.

In the United States, marshal is a civil official of U. S. courts, one being appointed by the President for each U.

U. S. judicial district; his duties correspond to those of sheriff in state courts. The U. S. marshal with his deputies enforces the statutes of the federal government in his district. In some southern and western states the head of a municipal police force is called a marshal; he is an official distinct from the sheriff of the county, and from a constable of a justice court. The name has been improperly applied sometimes to volunteer police officers called into service for a special time and purpose.

MARSHALL, *mâr'shal:* Ill., city, county-seat of Clark county; on the Vandalia Line and the Cleveland, C., C. & St. L. railroad; about 122 miles east by south of Springfield and 15 miles west by south of Terre Haute, Ind. It is in an agricultural and stock-raising region. Its chief manufactures are flour, woolen goods, condensed milk and other dairy products, and lumber. It has considerable trade in farm products, live-stock, and condensed milk. Pop. (1900) 2,077; (1910 est.) 3,197.

MARSHALL: Mich., city, county-seat of Calhoun county; on the Kalamazoo river, and on the Michigan C. and Cincinnati, J. & M. railroads; about 38 miles south by west of Lansing and 100 miles west of Detroit. The surrounding country is devoted chiefly to agriculture. The principal manufactures are school and church furniture, hot-air furnaces, patent medicines, breakfast food, flour, bicycles, wagons and carriages, windmills, bathtubs, electrical supplies, caskets, and agricultural implements. Marble and granite works employ a number of men. The grounds of the County Agricultural Society are located in Marshall. The electric-light plant and the waterworks are owned and operated by the city. Pop. (1900) 4,370; (1910 est.) 4,690.

MARSHALL: Minn., city, county-seat of Lyon county; on the Redwood river, and on the Chicago & N. W. and the Great N. railroads; about 160 miles west by south of Saint Paul. It is in an agricultural section in which wheat is the principal product. The industrial establishments are a flour mill, grain elevators, and a creamery. The principal buildings are the county court-house and the jail. The educational institutions are the public and parish schools, Holy Redeemer Academy, and a public library. Pop. (1900) 2,088; (1910 est.) 3,187.

MARSHALL: Mo., city, county-seat of Saline county; on the Missouri P. and the Chicago & A. railroads; about 80 miles east of Kansas City. It was settled in 1839 by people from Virginia and Kentucky, and was incorporated as a city in 1866. It is situated in an agricultural region; in the vicinity are valuable deposits of coal and salt, and nearby are stone quarries. The manufactures are lumber, tile and brick, flour, canned goods, creamery products, wagons and carriages. It is the seat of the State Institution for Feeble Minded and Epileptics; the Missouri Valley College (Cumberland Presbyterian),

established in 1889; San Saviour Academy (R. C.). There are eight churches and public and parish schools. Marshall has four banks with a combined capital of $300,000. The government is vested in a mayor, city marshal, and a council of six members, who are elected every two years. Pop. (1900) 5,086; (1910) 4,869.

MARSHALL: Texas, county-seat of Harrison county, is situated about 14 miles north of Sabine river, 40 miles west of Shreveport and 67 miles south of Texarkana. The city was founded in the year 1840. Marshall is situated in the midst of a fertile agricultural region which has heretofore engaged mostly in cotton raising, but recent developments show that this section is well adapted to truck growing and the raising of fruits, especially peaches, and large orchards are being planted. The city is largely supported, also, by lumber interests, there being large areas of pine timber contiguous to the city, which is rapidly being marketed. Stock raising is also carried on. The Texas & Pacific railroad runs through the city. The Texas Southern railroad has its terminus, at present, at Marshall, but will be pushed farther south. The shops of the Texas & Pacific railroad are located at Marshall. Locomotives and all kinds of rolling stock are manufactured. These shops employ 900 men and have a local pay-roll of $50,000 a month. The local shops and general offices of the Texas Southern railroad are also located in Marshall. Marshall has, in addition to the railroad shops, a cotton-seed oil mill; a large compress; car-wheel and foundry plant; wagon factories; a soda-water apparatus factory; and various other minor manufactories. The city has installed complete sewerage and waterworks plants.

Religiously, all the various denominations are represented, and have commodious houses of worship. The school system of the city is run on the latest and best methods, having three ward schools and a centrally located high school, well equipped with teachers and appliances. The public free schools are open nine months in the year. The total value of the city school property is $100,000. There are, also, a number of private schools. There are three Catholic schools in the city—one for girls and one for boys, and an industrial school for boys. In the city are also located Wiley University and Bishop College, institutions for the education of the negroes.

The city has two national banks, morning and evening daily papers, also a weekly paper and *The Messenger Monthly Magazine*. Marshall and vicinity is noted for the medicinal properties of its many springs and wells, and many people annually, especially during the summer season, visit these places as health resorts. Hartley's Well, situated within the corporate limits of the city of Marshall, is said to have wonderful curative qualities. Hynson's Iron Mountain Springs, situated five miles west,

and the Rosborough Springs, situated nine miles south, are also noted for their health-giving qualities. Pop. (1910) 11,452.

MARSHALL, *mâr'shal*, ALFRED, D.SC., LL.D.: English economist: b. London, 1842, July 26. He was educated at St. John's College, Cambridge, and in 1877 was principal of University College, Bristol. In 1883-4, he was lecturer at Balliol College, Oxford; since 1885 has been professor of political economy at Cambridge University; and has been a member of various public boards. He has published: *Economics of Industry* (1879); *Principles of Economics* (1890); *Elements of Economics* (1891); *The New Cambridge Curriculum in Economics* (1903); etc.

MARSHALL, ARTHUR MILNES, M.D., D.SC., F.R.S.: English naturalist: b. Birmingham, England, 1852; d. 1893, Dec. 31. He entered London University and in 1870, at the age of 18 years, received his degree of B.A.; in 1871, he entered St. John's College, Cambridge, from which he graduated as senior in the natural science tripos in 1874. He was sent by the University of Cambridge in the following year to its zoological station in Naples, but after studying there for a few months returned to Cambridge and assisted Professor Balfour in organizing the classes of comparative morphology; at this time also he took up the study of medicine. In 1879, he was appointed professor of zoology at Owens College, Manchester; in 1885, was elected a fellow of the Royal Society; in 1887, entered St. Bartholomew's Hospital; in the same year was elected a fellow of St. John's College; subsequently took his degree of M.D. at Cambridge; in 1891-2 was a councillor of the Royal Society; and in 1892 presided over a section of the British Association. He was largely instrumental in organizing the biological classes at Victoria University. Though particularly distinguished as a teacher and organizer his publications added much to the scientific knowledge of embryology. They include *The Frog: an Introduction to Anatomy and Histology* (London 1883; 7th ed. 1900); *The Segmental Value of the Cranial Nerves* (1882); *Vertebrate Embryology* (1893); and numerous papers in the *Quarterly Journal of Microscopical Science*. His *Biological Essays and Addresses* and *Darwinian Theory* were published posthumously.

MARSHALL, EDWARD: American journalist: b. Enfield Centre, N. Y., 1868, May 31. He was educated in the public schools at Rochester and entered journalism in New York city, where he conducted an editorial crusade against the conditions existing in tenement buildings. He has been connected with leading New York newspapers and was special correspondent during the Spanish-American war. He has published *The Rough Riders* (1898); *Lizette* (1902); *The Middle Wall* (1904); *By Wireless* (1907); etc.

MARSHALL, Emma Martin: English novelist: b. North Repps, near Cromer, Norfolk, 1830, Sep. 29; d. Clifton, near Bristol, 1899, May 4. She was married to H. G. Marshall in 1851, and her life thereafter was mainly spent in the cathedral towns of Wells, Exeter, Gloucester, and Bristol. She wrote more than 100 volumes, nearly all of them stories intended mainly, though not entirely, for young people. In spite of their number the even excellence of the tales is remarkable, and they may be called historical pictures rather than historical tales. Her plan was to introduce into each story several historical personages, as secondary characters, the principal figures being imaginary. Her books have had a wide reading in the United States and still continue popular. Among them are: *Under Salisbury Spire* (1889); *In the East Country with Sir Thomas Browne; Haunts of Ancient Peace; In the Choir of Westminster Abbey in the Time of Henry Purcell* (1897); *Under the Dome of St. Paul's* (1898). Consult: B. Marshall, *Life of Emma Marshall* (1900).

MARSHALL, Henry Rutgers, A.M., L.H.D.: American author and architect: b. New York city, 1852, July 22. He was graduated at Columbia in 1873, and in 1878 entered practice as an architect. In 1902, he was appointed a member of the Art Commission of the City of New York. Besides contributions to literary, philosophical, and psychological periodicals, he wrote: *Pain, Pleasure, and Æsthetics* (1894); *Æsthetic Principles* (1895); and *Instinct and Reason* (1898).

MARSHALL, Humphrey: American botanist: b. West Bradford (the present Marshallton), Pa., 1722, Oct. 10; d. there, 1801, Nov. 5. He followed the stonemason's trade, but devoted his leisure to astronomy, building a small private observatory, and to natural history. He began the collection and cultivation of the more interesting indigenous plants, and in 1773 established the Marshallton botanical garden, where were assembled trees and herbaceous plants of the United States. For years he was treasurer of Chester county, Pa., and in 1786 he was elected to the American Philosophical Society. His *Arboretum Americanum*, described as 'an Alphabetical Catalogue of Forest Trees and Shrubs, Natives of the American United States' (1785), was translated into several European languages.

MARSHALL, Humphrey: American politician: b. Westmoreland county, Va., 1756; d. near Frankfort, Ky., 1841, July 1. He joined the Continental army at the outbreak of the Revolution, became captain of Virginia cavalry (1778), in 1780 established himself on a Kentucky plantation, opposed the separation of Kentucky from Virginia, and as a delegate to the Danville convention of 1787 was prominent in defeating the measure. He was also a delegate to the Virginia convention that ratified the constitution of the United States, and in

1793 was a representative from Woodford county in the Kentucky legislature, where he declared his opposition to the plans for raising in Kentucky troops under Gen. George Rogers Clark for an attack on the Spanish settlements near the mouth of the Mississippi river. From 1795, Dec. 7, to 1801, Mar. 3, he was a Federalist senator in the Congress of the United States, and in 1806 was active in denunciation of Aaron Burr. He represented Franklin co. in the Kentucky legislature in 1807-9, and had a dispute with Henry Clay which resulted in a duel in which Clay received a slight wound. He sat again for Franklin co. in 1823. He published the first *History of Kentucky* (1812; rev. ed. 1824).

MARSHALL, HUMPHREY: American soldier: b. Frankfort, Ky., 1812, Jan. 13; d. Louisville, Ky., 1872, Mar. 28. He was graduated from the United States Military Academy in 1832, entered the mounted rangers, served in the Black Hawk war (1832), and resigned from the army 1833, Apr. 30. Admitted to the bar in 1833, he practiced in Frankfort (1833-4) and Louisville (1834-6), became a lieutenant-colonel of Kentucky militia in 1841, and raised for the Mexican war the first regiment of Kentucky cavalry, of which he was made colonel, 1846, June 9. He fought at Buena Vista 1847, Feb. 22-23. From 1849, Dec. 3, to 1852, Aug. 4, he served as a Whig in the 31st and 32d Congresses; in 1852-4 was minister plenipotentiary to China, and from 1855, Dec. 3, to 1859, Mar. 3, was again in Congress, this time as an American, or Know-Nothing. In 1861 he was commissioned a brigadier-general in the Confederate army, with command of the Army of Eastern Kentucky. On Jan. 10, 1862, he was defeated by Gen. Garfield at Middle Creek (Floyd co.) in one of the most important of the minor battles of the Civil war. In 1862, May, he surprised Gen. J. D. Cox at Princeton, Va., and was thus of much service to Lee through the relief of the Lynchburg & Knoxville railway. Having resigned his commission in 1862, he represented Kentucky in the congress of the Confederate States (1863-5). From 1867 he practiced law with much success at Louisville.

MAR'SHALL, JOHN, LL.D.: chief-justice of the United States: 1755, Sept. 24—1835, July 6; b. Fauquier co., Va.; eldest of 15 children of Col. Thos. Marshall. After studying with his father he went to school at Westmoreland at the age of 14, and studied later under a private tutor, until at the age of 18 he began the study of law. In 1775 he left his studies uncompleted, and joined a military company in a regiment in which his father was major. He distinguished himself at the battle of Great Bridge; 1776, July, he was made lieutenant in the 11th Virginia regiment and went north; 1777, May, he became captain, and was in active service till the close of 1779, taking part in the battles of Brandywine, Germantown, Monmouth, and minor engagements, and sharing the hardships of Valley Forge, where he gained the esteem of

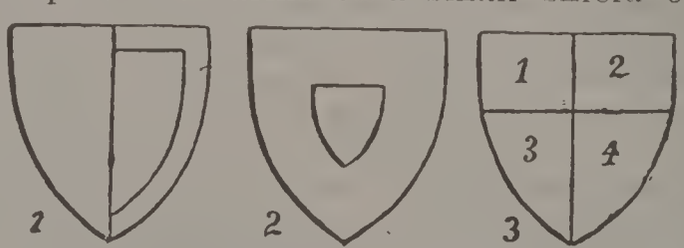
Washington. In the winter of 1779 he was sent to Va. to take command of a new corps to be raised there, meanwhile attending lectures on law and natural philosophy at William and Mary College. Next summer he was licensed to practice law, but went back to the army, the project of a new corps in Va. having failed. He remained in the army till 1781, when he resigned, and at the close of the war began practice as an attorney, in which his unusual grasp and comprehension of mind, coupled with great amiability, gave him success from the start. In 1782 he was elected to the house of delegates; 1783 he married Mary Willis, daughter of Treasurer Ambler, and removed to Richmond; 1787 he was again elected to the house, to represent Henrico co.; and 1788, June, he was a member of the Va. convention to consider the constitution drawn up at Philadelphia, whose adoption he eloquently and effectively advocated. The credit of its final acceptance by a vote of 89 to 79 belongs to him and Madison more than to any others. When, 1788, Richmond was given the right to send a representative to the assembly, M. was elected and held his seat during the sessions of 1789, 90, and 91, supporting the federal side against the state rights party with marked ability and vigor, yet without losing the esteem and friendship of even his most earnest opponents. 1792–95 he devoted himself to his legal practice, though often appearing in public in defense of Washington's administration; 1795 he was again in the assembly, defending Jay's treaty with good effect. He declined the attorney-generalship and the appointment as minister to France, though finally accepting the latter from Adams, and representing the administration so ably in the fruitless negotiations in Paris, 1797, with reference to the obstructions offered American commerce, that on his return he was received with extraordinary demonstrations of public favor. He then returned to his practice, only, however, to be elected to congress 1799, and at once to become the acknowledged federal leader there, among the rest making his famous speech defending the executive's action in surrendering the murderer Robbins to the British in compliance with a clause in Jay's treaty, and forever settling the points in international law involved. 1800, May, he was made secretary of state; and 1801, Jan. 31, was appointed by Adams chief justice of the U. S. supreme court, where his influence was acknowledged to be paramount. 1804–07, he published a *Life of Washington*, 5 vols., which, 1832, was revised and condensed into 2 vols. In 1828 he served in the Charlottesville convention for devising a system of internal improvements; and 1829 in the reform convention to revise the old state constitution. He died in Philadelphia where he had gone to procure medical relief from an attack of liver complaint. His unassuming piety, modesty, and amiability gained the love and respect of all classes. *The Writings of John Marshall*, etc. (Boston 1839), have been

published under the supervision of Judge Joseph Story his life has been written by Van Santvoord, in *Sketches of the Chief Justices* (New York 1854); Flanders, in *Lives and Times of the Chief Justices* (Philadelphia 1858); and Magruder, in *John Marshall* (Boston 1885).

MAR'SHALL, Thomas Francis: 1801, June 7—1864, Sep. 22; b. Frankfort, Ky.; nephew of John M.; practiced law at Versailles and Louisville; served in the legislature 1832–36 and again 1838–9, with great ability. 1841–43 he was in congress, and was made conspicuous by his proposed censure of John Quincy Adams. Though a whig, he opposed Clay's U. S. Bank Bill; favored the annexation of Texas, and the election of Polk. 1846 he served in the Mexican war; and during the latter years of his life was successful as a popular lecturer. He died near Versailles, Ky.

MAR'SHALLING OF ARMS, in Heraldry: the combining of different coats-of-arms in one escutcheon, to indicate family alliance or office. In the earlier heraldry, it was not the practice to exhibit more than one coat in a shield, but the arms of husband and wife were sometimes placed *accollée*, or side by side, in separate escutcheons; or the principal shield was surrounded by smaller ones, containing the arms of maternal ancestors; and maternal descent or marriage was frequently indicated by the addition of some bearing from the wife's or mother's shield. Then followed *dimidiation*, where the shield was parted per pale, and the two coats placed side by side, half of each being shown. By the more modern custom of impaling (fig. 1), the whole of each coat is exhibited, a reminiscence of the older practice being retained in the omission of bordures, orles, and treasures on the side bounded by the line of impalement. The most common case of impalement is where the coats of husband and wife are conjoined, the husband's arms occupying the dexter side of the shield, or place of honor, and the wife's, the sinister side. Bishops, deans, heads of colleges, and kings-at-arms, impale their arms of office with their family coat, giving the dexter side to the former.

A man who marries an heiress (in heraldic sense) is entitled to place her arms on a small shield called an



Marshalling of Arms.

escutcheon of pretense, in the centre of his achievement, instead of impaling, as in fig. 2.

Quartering (fig. 3), or the exhibiting different *coats* on a shield divided at once perpendicularly and horizontally, is the most common mode of marshalling arms since

about the middle of the 14th c. The divisions of the shield are called quarters, and are numbered horizontally, beginning at the dexter chief. The most common object of quartering is to indicate descent. The coats quartered in an escutcheon must all have been brought in by successive heiresses (heraldic), who have intermarried into the family. In the case of a single quartering, the paternal arms are placed in the first and fourth quarters and the maternal in the second and third. The third and fourth quarters may, in after-generations, be occupied by the arms of a second and third heiress. Sometimes an already quartered coat is placed in one of the four quarters of the escutcheon, then termed a grand quarter. Occasionally the shield is divided by perpendicular and horizontal lines into six, nine, or even more parts, each occupied by a coat brought in by an heiress; and in case of an odd number of coats, the last division is filled by a repetition of the first. In the course of generations, a shield may thus be inconveniently crowded by the accumulation of coats, including the several coats to which each heiress may, in a similar way, have become entitled, and in Germany, sometimes 20 or 30 coats are found marshalled in one escutcheon; but in British heraldry, families entitled to a number of quarterings, generally select some of the most important. Quarterings, at least in Scotland, are not allowed to be added to the paternal coat without the sanction of the heraldic authorities.

Sovereigns quarter the ensigns of their several states, giving precedence to the most ancient, unless it be inferior to the others in importance. In the royal escutcheon of the United Kingdom, England is placed in the first and fourth quarters, Scotland in the second, and Ireland in the third: the relative positions of Scotland and England being, however, reversed on the official seals of Scotland. Spain bears the arms of Leon in the first and fourth quarters, and of Castile in the second and third. An elected king generally places his arms surtout on an escutcheon of pretense.

MAR'SHALL ISLANDS: group in the Pacific Ocean, in Micronesia; lat. 7° 30′ n., long. 173° 30′ e.; near the Kingsmills, Caroline, Ellice, and Pleasant groups; port of entry Jaluit; since 1885, Oct. 15, under the protectorate of Germany, they are governed by a high commissioner; yield chiefly copra, though shells, red and pink coral, and sponge are found in limited quantities. They used Chilian and Peruvian coin till the German occupation, when German coin became a legal tender. The people manufacture mats, hats, and fans from the fibre of the cocoa-nut and other native trees. Commercial firms doing a business of $125,000, or more per year have to pay a yearly license of $1,500, and those doing a less business $750. The natives pay a yearly tax of $2,000 in copra, at 1c. per lb.; foreigners a poll-tax of $5 per annum; and all trading vessels not belonging to firms

established on the islands $250 per trip. The yearly yield of copra is about 3,000,000 lbs. Pop. (1900), 15,063.

MAR'SHALLTOWN: Iowa, city, county-seat; on the Chicago & North-Western, the Chicago Great Western, and the Iowa Central railroads; about 70 m. n.e. of Des Moines. It was settled in 1860 and in 1863 was incorporated as a town. In 1868 it received a charter as a city of the second class. It is an agricultural and stock-raising region in which wheat and corn are the chief farm products. Some of the industrial plants are flour-mills, grain elevators, glucose factories, meat-packing plants, furniture factories, carriage works, foundry and machine shops, and bottling works. It has the Iowa State Soldiers' Home, St. Mary's Institute (R. C.), and public and parish schools. The city is governed by an administration elected under a general law of the state, passed in 1898, which provides for a mayor, a unicameral council, and a school board to be chosen by popular vote. The electric-light plant and the waterworks are owned and operated by the city. Pop. (1910) 13,374.

MARSH'FIELD: city in Wood co., Wis., on the Wisconsin Central, the Chicago, St. Paul, Minneapolis & Omaha, and the Chicago & North-Western railroads; almost in the centre of the state, about 190 miles n.w. of Milwaukee. It was settled in 1871 by Louis Rivers, and was incorporated as a village in 1875, and chartered as a city in 1883. It is situated in an agricultural region and near extensive forests. The industries of the city are chiefly connected with manufacturing and farming. The chief industrial establishments are a furniture factory which employs 300 persons; veneer factory, 125; bed and mattress factory, 40; lumber-mills, 50; brick yards, 25; cooperage and excelsior factory, 40; other establishments employing about 30 persons. The city has a fine city-hall, a public library, seven churches, a high school, four public and two parish schools. The two banks have a combined capital of $800,000. The government is vested in a mayor and 12 aldermen, who are elected every two years. About two-thirds of the inhabitants are of German descent. Pop. (1910) 5,783.

MARSH-MALLOW (*Althæa*): genus of plants of nat. ord. *Malvaceæ*, differing from the true mallows chiefly in the 6-9-cleft outer calyx. The species, which are not numerous, are annual and perennial plants, with showy flowers, natives of Europe and Asia. COMMON MARSH-MALLOW (*A. officinalis*) grows in meadows and marshes, especially near the sea. It has a stem 2 to 3 ft. high, entire or 3-lobed leaves, both leaves and stem densely clothed with soft, starry down, and large, pale, rose-colored flowers on short 3-4-flowered axillary stalks. Lozenges made from it (*Pâtes de Guimauve*) are in use. The whole plant is wholesome, and in seasons of scarcity, the inhabitants of some eastern countries often have

recourse to it as a principal article of food. It is said to be palatable when boiled, and afterward fried with onions and butter. The Hollyhock (q.v.) is commonly referred to this genus.

MARSH'MAN, JOSHUA, D.D., 1768, Apr. 20—1837, Dec. 5; b. Westbury-Leigh, England: Bapt. missionary. He received a limited education; worked as a weaver till 1794; took charge of a school in Bristol, and while teaching learned the classic, Hebrew, and Syriac languages; joined the Bapt. Church 1799; and was sent to India as a missionary the same year. Prohibited from carrying out his intention of laboring in Calcutta, he landed in Serampore 1799, Oct. 13, and made that the centre of his untiring and devoted work till his death. He at once began studying the Bengalee, Sanskrit, and Chinese languages; began preaching in Bengalee within a year; established a college for instruction of Asiatic, Christian, and other youth in Eastern literature and European science about 1818; and began periodical publication in Bengalee, and established a monthly-paper, the *Friend of India*, 1818. His labors in India were interrupted only by one visit to England 1826–29. His literary work was of great importance; it comprises dictionaries of the Mahratta (1 vol., 1811) and Bengalee (3 vols.) languages; a Chinese version of the New Test. (1822), a *Dissertation on the Characters and Sounds of the Chinese Language; The Works of Confucius, containing the Original Text with a Translation; Clavis Sinica: Elements of Chinese Grammar;* and *A Defence of the Deity and Atonement of Jesus Christ.* He received his degree from Brown Univ. 1811. See *Life and Times of Carey, Marshman, and Ward*, 2 vols. (London 1859).

MARSH-MAR'IGOLD (*Caltha*): genus of plants of the nat. order *Ranunculaceæ*, having about 5 petal-like sepals,

(Marsh-Marigold *Caltha palustris*).

no petals, and the fruit consisting of several spreading, compressed, many-seeded follicles. *C. palustris* is a species with kidney-shaped shining leaves and large yel-

low flowers, ornament of wet meadows and the sides of streams in spring. It partakes of the acridity common in the order; but the flower-buds, preserved in vinegar and salt, are said to be a good substitute for capers.

MARSH-ROSEMARY, *mârsh'rōz-mā-rĭ:* plant common to the shores and salt marshes of the United States, Canada, and Europe; the *Statice Limonium*, known also as Sea-lavender. It is perennial; has a cluster of oblong, bristle-pointed, single-ribbed leaves; develops a branched scape 1 to 2 ft. high, from which grow numerous lavender-colored small flowers; and bears a single-seeded utricle in the base of the calyx. Its root contains more than 12 per cent. of tannic acid, which with other properties renders it an invaluable remedy when prepared by infusion for hemorrhages and (as a gargle) for sore mouths and throats. There are numerous varieties, and botanists differ as to their identity with a common species.

MARSH'S TEST. See ARSENIOUS ACID.

MARSILEACEÆ, *mâr-sĭl-ē-ā'sē-ē*, or RHIZOCARPEÆ, *rī-zō-kâr'pē-ē:* nat. ord. of acotyledonous plants, nearly allied to *Lycopodiaccæ*, but differing in the lack of a stem, and in the usually stalked leaves. The species all are inhabitants of ditches and pools, chiefly in temperate regions. No species was known to be of any importance till the discovery of the Nardoo (q.v.) of Australia.

MARSIPOBRANCHII, *mâr'sĭp-ō-brăng'kĭ-ī:* order of fishes including lampreys and hag-fishes; same as the demopterous fishes of Owen. They are the second of Huxley's six orders of fishes. See HAG (fish); LAMPREY.

MARS-LA-TOUR, *mâr-lâ-tôr':* small village in France, 15 m. from Metz, on the road to Verdun. In the Franco-German war it was the scene of part of the battle of Gravelotte (q.v.).

MARSTON, *mârs'ton*, GILMAN: lawyer: b. Orford, N. H., 1811, Aug. 20; d. 1890, July 3. He graduated at Dartmouth 1837, and at Harvard Law School 1840; was admitted to the bar 1841; was member of the New Hampshire legislature 1845-8, 1872-7, and 1879-88; delegate to state constitutional convention 1850 and 1876; member of Congress 1859-63 and 1865-7; and was defeated for Congress 1877. In the Civil war he was colonel of the 2d New Hampshire volunteers, and was promoted brigadier-general of volunteers 1862, Nov. 29.

MARSTON, JOHN: English dramatic author: b. about 1575; d. London, 1634, June 25. He was graduated at Brasenose College, Oxford, in 1595, took orders, and obtained, in 1616, the living of Christchurch, Hampshire, which he resigned in 1631. He was the author of several tragedies, including *The Malcontent* (1604), and *Sophonisba* (1606); and comedies such as *The Fawn* (1606); and *What You Will* (1607). With Ben Jonson and Chapman he wrote the comedy *Eastward Ho* (1605).

MARSH MARIGOLD (*Caltha palustris*).

MARS'TON, JOHN: 1795, June 12—1885, Apr. 7; b. Boston; naval officer. He was appointed midshipman in the U. S. navy 1813; served in the latter part of the war 1812–15; was promoted lieut. 1825 and attached to the *Brandywine* which took Lafayette to France; promoted commander 1841; commandant navy-yard at Philadelphia 1853–55; capt. 1855; placed on the retired list 1861, but retained in active service; commodore 1862; commanded the *Roanoke* when the *Merrimac* destroyed the *Congress* and *Cumberland* in Hampton Roads; promoted rear-admiral; and was afterward on duty as commandant of the navy-yards at Philadelphia and Portsmouth and the naval station at Key West, and as light-house inspector.

MARS'TON MOOR, BATTLE OF: 1644, July 2; on an open plain 8 m. n.w. of York, England; between the combined parliamentary and Scotch armies under Lord Fairfax and the Earl of Leven, and the royal armies under Prince Rupert; strength of each side about 25,000 men. Lord Fairfax had been besieging York, which was held by the royalists, and when Prince Rupert advanced to its relief Fairfax withdrew to the moor; and the opposing armies meeting in the afternoon began the battle almost simultaneously with ineffectual cannonading. Early in the evening Rupert ordered a charge with cav. and close combat. His right wing broke the allied left wing, and caused the disorderly flight of a large force. While the royal cav. was scattered in pursuit or plundering, Cromwell's 'ironside' brigade and Leslie's Scotch regts. were rallied by Sir Thomas Fairfax, and ordered to charge the main royalist body. This movement was successful, the royalists were driven from the field with a loss of their artill., 100 colors, 1,500 prisoners, and subsequently of York itself. Both armies lost about 2,000 men, and the parliamentary party gained control of the n. of England as the most important result of the battle.

MARSUPIAL, a. *mâr-sū'pĭ-ăl* [L. *marsu'pĭŭm;* Gr. *marsu'pĭŏn*, a pouch: F. and Sp. *marsupial*]: having a pouch. MARSU'PIALS, n. plu. *-pĭ-ălz*, animals that carry their young in a pouch, as the opossum and kangaroo. MARSU'PIA'LIA, *-pĭ-ā'lĭ-ă*, or MARSU'PIA'TA, n. plu. *-pĭ-ā'tă*, an order of mammalia having a sack or pouch under the belly in which they carry their young (see below). MARSU'PIUM, n. *-pĭ-ŭm*, the pouch of marsupial animals; a dark-colored membrane in the vitreous body of the eyes of birds. MARSUPITE, n. *mâr'sū-pīt*, in *geol.*, genus of free-floating crinoidea, found in the Chalk formation, having a bag-like shape when closed—called by quarrymen, 'cluster stones;' called also Tortoise Encrinites: see CRINOIDS.

MARSUPIALIA, *mâr-sū-pĭ-ā-lĭ-a*, or MARSUPIATA, *mâr-sū-pĭ-ā'ta*: extensive order of non-placental mammals, differing essentially from all others in their organization, especially in their generative system. They include the opossum and kangaroo. The other order of non-placental mammals is the *Monotremata* (q.v.). The animals of this aberrant group originally received the name of *Animalia Crumenata*, or Purse-bearing Animals; and the names now employed have similar signification. The marsupium, or pouch, which is situated on the abdomen of the female, contains the teats, and serves for the protection of the immature young; and is the most marked characteristic of these animals. As the different genera of this order live on various kinds of food—some being herbivorous, others insectivorous, and others purely carnivorous—there are various modifications of their organs of progression, prehension, and digestion; for the most important of these modifications, see the titles of the principal genera. The characters common to the group are here to be noticed.

The leading peculiarity presented by the skeleton is the presence of the marsupial bones (see MAMMALIA), which are attached to the pubis, and are embedded in the abdominal muscles. Another constant but less striking peculiarity is a greater or less inversion of the angle of the lower jaw. The organs of digestion, including the teeth, vary extremely, according to the nature of the food; a complex stomach and a cecum of considerable size being present in some; while others (the carnivorous genera) having a simple stomach and no cecum. The brain is constructed on a simpler type than in the placental mammals. The size of the hemispheres (fig. 1, A) is so small that they leave exposed the olfactory ganglion (*a*), the cerebellum (C), and more or less of the optic lobes (B), and they are but partially connected together by the 'fornix' and 'anterior commissure,' the great cerebral commissure known as the 'corpus callosum' being absent. In accordance with this condition of the brain, all these animals are characterized by a low degree of intelligence, and are said (when in captivity) not to manifest any recognition of their feeders. It is, however, especially in the organs of generation and mode of reproduction that these animals differ from all the ordinary mammals. Prof. Owen, who has done more to elucidate this subject, and indeed the anatomy and physiology of marsupiata generally, than any other anatomist, observes that in all the genera of this order the uterus is double, and the introductory passage more or less (sometimes wholly) separated into two lateral

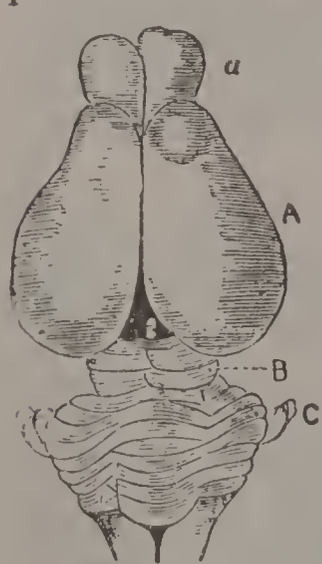


Fig. 1.
Brain of Opossum.

sanals. Both the digestive and generative tubes terminate within a common Cloaca (q.v.), and there are various other points in which these animals manifest their affinity to the oviparous vertebrates. The marsupial bones serve important purposes in connection with their generative economy. 'In the female,' he observes, 'they assist in producing a compression of the mammary gland necessary for the alimentation of a peculiarly feeble offspring, and they defend the abdominal viscera from the pressure of the young as these increase in size during their marsupial existence, and still more when they return to the pouch for temporary shelter,' while in the males they are subservient to the reproductive process. The marsupials belong to the *aplacental* division of the Mammalia (q.v.). The period of their gestation is short (26 days in the Virginian opossum, 39 days in the kangaroo), and the young are produced in so immature a state, that the earlier observers believed that they were produced like buds from the nipples to which they saw them attached. The appearance presented by a young kangaroo of one of the largest species, within 12 hours of its being deposited in the pouch, is described by Prof. Owen (from personal observation in the Zoological Gardens) as follows: 'It resembled an earthworm in the color and semi-transparency of its integument, adhered firmly to the point of the nipple, breathed strongly but slowly, and removed its fore-legs when disturbed. The body was bent upon the abdomen, its short tail tucked in between the hind-legs, which were one-third shorter than the fore-legs. The whole length from the nose to the end of the tail, when stretched out, did not exceed one inch and two lines.' The mother apparently employs her mouth in placing the young at the nipple, where it remains suspended, involuntarily absorbing milk for a considerable time (probably about two months on an average), after which, it sucks spontaneously for some months. Although able from the first, by the muscular power of its lips, to adhere firmly to the nipple, it does not possess the strength to obtain the milk by the ordinary process of sucking. In the process, it is assisted by the adaptation of a muscle to the mammary gland, which, by contracting, injects the milk from the nipple into the mouth of the adherent fetus; and, to prevent the entrance of milk into the air-passage, the larynx is prolonged upward to the aperture of the posterior nares, where it is closely embraced by the muscles of the soft palate. The air-passage is thus entirely separated from the throat, and the milk passes on either side of the larynx into the esophagus.

Prof. Owen has proposed that these animals should be divided into five tribes or primary groups, viz., *Sarcophaga*, *Entomophaga*, *Carpophaga*, *Poephaga*, and *Rhizophaga*, according to the nature of their food. With the exception of one American and one Malayan genus, all known existing marsupials belong to Australia, Tasmania, and New Guinea.—For further details regarding

this order, see Waterhouse's *Natural History of the Mammalia*, I. and Owen's article 'Marsupialia' in *Cyclopædia of Anatomy and Physiology.*—See KANGAROO: OPOSSUM: DASYURE: THYLACINE.

MART, n. *mârt* [contr. from *market:* Swiss, *marcht*, a market; *marten*, to traffic]: a place of public sale or traffic: V. in *OE.*, to buy or sell: to traffic. MART'ING, imp. MART'ED, pp. *Note.*—MARKET is also said to be derived from Gael. *marc*, a horse, meaning originally a place for the sale of horses, then for cattle in general, and finally for all kinds of commodities. MART may not be treated exactly as a contraction from *market*, but rather as derived from Gael. *mart*, a cow, meaning thus the place of sale for cows as distinguished from that of horses, and finally a place for public sales on a large scale—see MARKET and MART in Mackay's *Gaelic Etymology.*

MARTABAN, *mâr-ta-bân':* small town in the province of Pegu, British Burmah, on the banks of the Martaban or Salwen, and near its mouth in the Gulf of M., lat. 16° 32′ n., long. 97° 35′ e. It was the first town that fell into the hands of the British in the Burmese war 1852.

MARTAGON, n. *mâr'tă-gŏn* [F. and Sp. *martagon;* It *martagone*]: a plant called mountain-lily or Turk's-cap; the *Lilĭum superbum*, ord. *Lilĭăcĕæ.*

MARTEL, v. *mâr'tēl* [F. *marteler*, to hammer: OF *martel*, a hammer—from mid. L. *martellus*]: in *OE.*, to strike; to make a blow. MAR'TELLING, imp., MARTELLED, pp. *mâr'tĕld.*

MARTEL, CHARLES: see CHARLES MARTEL.

MARTELLO, n. *mâr-tĕl'lō*, or MARTELLO TOWERS [from forts in Corsica so named: It. *martello*, clapper of a bell —from mid. L. *martellus*, a hammer]: round towers on the sea-side for coast defense, about 40 ft. high, built most solidly; named from Italian towers built near the sea when piracy was common in the Mediterranean, for keeping watch and giving warning of the approach of a pirate-ship. This warning was given by striking on a bell with a hammer; hence these towers were called *Torri da Martello.* They occur in several places round the coast of the United Kingdom; but principally opposite to the French coast, along the s. shore of Kent and Sussex, where, for many miles, they are within easy range of one another. They were erected mostly during the French war, as a defense against invasion. Each had walls of 5½ ft. thickness, and was supposed to be bomb-proof. The base formed the magazine; above were two rooms for the garrison, and over the upper of these the flat roof, with a 4½-feet brick parapet all round. On this roof a swivel heavy gun was to be placed to command shipping, while howitzers on each side were to form a flanking defense in connection with the neighboring towers. Although the cost of these little forts was very great, they are generally considered a failure; their armaments

have mostly been removed, and their garrisons of 6 to 12 pensioner-soldiers replaced by coast-guard men, or by old master-gunners.

MARTEN, n. *mâr'tĕn* [F. *martre*—from It. *martora*—from mid. L. *martălus*—from a supposed L. *martēs*, a marten], (*Martes*): group of digitigrade carnivorous quadrupeds of family *Mustelidæ*, differing from weasels in having an additional false molar on each side above and below, a small tubercle on the inner side of the lower carnivorous cheek-teeth, and the tongue not rough—characters regarded as indicating a somewhat less extreme carnivorous propensity. The body is elongated

1, Common Marten (*Martes foina*); 2, Pine Marten (*Martes abietum*).

and supple, as in weasels, the legs are short, and the toes separate, with sharp long claws; the ears are larger than in weasels, and the tail is bushy. The martens exhibit great agility and gracefulness in their movements, and are very expert in climbing trees, among which they generally live. The martens range widely throughout the n. hemisphere, and are most abundant in Siberia and n. parts of N. America. The COMMON M., BEECH M., or STONE M. (*M. foina*), and the PINE M. (*M. abietum*), were formerly much more common in inhabited regions than

they now are, being sought on account of their fur, and killed on every opportunity, because of their excessive depredations among game and in poultry-yards. The head and body are about 18 inches long, the tail nearly 10 inches. Both species are of dark tawny color, the Common M. having a white throat, and the Pine M. a yellow throat. Many naturalists regard them as varieties of one species, of which they reckon the sable (q.v.) as another variety. The fur of the M. is of two sorts: an inner fur, short, soft, and copious; and long outer hair, from which the whole fur derives its color. The Common M. is much less valuable for its fur than the Pine M., while the Pine M. is much less valuable than the sable; but skins of the Common M. are exported in great numbers from n. Europe, and they are often dyed, and sold as an inferior kind of sable. M. fur varies greatly according to age, sex, season, etc. Pine M. skins are largely procured from n. Europe, Siberia, and N. America.—The martens generally have their retreats in the hollow trunks of trees, or usurp the nest of a magpie or other bird, but sometimes among rocks. They are capable, if taken young, of a degree of domestication, and have been used to rid houses of rats and mice.—The *Spotted M.* or Long-tailed *Dasyure* is a marsupial.

MARTENSEN, *mâr′ tĕn-sĕn*, Hans Lassen, D.D.: 1808, Aug. 19—1884, Feb. 4; b. Flensborg, Denmark: theologian. He studied theol. in the Univ. of Copenhagen; spent 1832 in Berlin, Vienna, Paris, and Munich; received his degree 1836: became prof. of philosophy in the Univ. of Copenhagen 1840, and subsequently of theol.; was appointed preacher to the court 1845: and succeeded to the bishopric of Sealand, the highest office in the Danish Church, 1853. He attracted wide attention by his interpretation of the mysticism of the middle ages in his *Mester Eckart* (1840). This was followed by an *Outline of a System of Ethics* (1841), and *Christian Dogmatics* (1849). In the latter he undertook, as a follower of Hegel, to reconcile faith and reason, revelation and science, and made an eloquent and ingenious exposition of his views, which gained for him many admirers in Germany, Holland, Scotland and Sweden, as well as in his own country. Beside several collections of sermons, he also published a *System of Christian Ethics* (1872), a lofty, inspiring, and instructive treatise; and a continuation treating of *The State* (1878).

MARTHA'S VINEYARD, *mâr′thaz vĭn′ yĕrd*: island in the Atlantic Ocean, off the s. coast of Mass., forming the greater part of Dukes co.; 19 m. long, average breadth 5 m.; chief towns, Chilmark, Edgartown, Gay Head, Cottage City, and Tisbury. It is separated from the mainland by Vineyard Sound; is in general level, though portions are 150 ft. above sea-level; and has considerable tracts of low forest, and a light soil that in places is quite productive. It bears a lighthouse, lat. 41° 20′ 52″ n., long. 70° 49′ 47″ w., whose white flashing light is 170 ft. above

sea-level. Gay Head is at the s.w extremity; Oak Bluffs, or Cottage City, forming the modern part of Edgartown, is at the e.; and w. of it and on the n. coast is Vineyard Haven. Edgartown village is the co. seat. The island has telegraph and telephone connection with the mainland, street and steam railroads, many large hotels, and large colonies of summer residents on all sides occupying pretty cottages; and is reached by steamer from New Bedford and Wood's Hall. Since 1835 the island has been noted for its camp-meetings, established first by the Methodists, afterward by the Baptists, and now conducted annually by both. The advantages of Martha's Vineyard as a summer resort for families are its complete isolation, combined with accessibility, salubrity of climate, purity of air and water, delightful coolness, and uniformity of temperature; its safety in sea-bathing, there being no undertow; its fine beach; unsurpassed facilities for boating, fishing, and yachting; absence of liquor-selling, dissipation, and gambling; strong religious sentiment, though not at all prohibitive of rational amusement; variety, elegance, and beauty of its cottages, tents, flower-gardens, and parks; magnificent view of the ocean, with vessels passing each way day and night; and the cordial, social spirit of its summer residents.—Martha's Vineyard was discovered by Bartholomew Gosnold (q.v.) 1602, who, however, gave the name Martha's Vineyard to the island near by, now known as No Man's Land; and was settled by Thomas Mayhew (q.v.), merchant of Southampton, England, who obtained a grant of this and the neighboring islands, 1642. When Mayhew reached the island he found on it and Nantucket 3,000 adult Indians; in 1675 there were 1,500 braves (warriors) on Martha's Vineyard alone; in 1702 there were 1,600 natives under Christian training; but now there are not more than 25 descendants of these Indians, whose tribal name has long been forgotten. Martha's Vineyard became a part of Massachusetts 1644, of New York 1664, and again of Massachusetts 1692; and was frequently plundered by the British in the Revolutionary war.

MARTIAL, a. *mâr'shăl* [F. *martial*—from L. *martĭālĭs*, belonging to Mars—from *Mars*, the god of war]: pertaining to war; suited to war; warlike; brave; military; soldier-like. MAR'TIALLY, ad. *lĭ*.

MARTIAL, *mâr'shĭ-al* (MARCUS VALERIUS MARTIALIS): great Roman epigrammatist: A.D. 40 or 41—about 104; b. Bilbilis, in Spain. In 65 he came to Rome, where he resided for 34 years, when he returned to his native town. In this exile from the gay life of Rome, he consoled himself with the society of a literary patroness, a lady called Marcella, on whose property he lived till his death. When at Rome, he early became famous as a wit and poet; received the patronage of Emperors Titus and Domitian, and obtained from them the privileges of those who were fathers of three children, and, in addi-

tion, the rank of tribune, and the rights of the equestrian order. He lived, seemingly, in affluence, in a mansion in the city, and in Nomentum, a suburban villa, to both of which he makes frequent reference. But, though appearing affluent, he was always seeking money from wealthy patrons, whom he repaid with the gross flattery commonly in those times addressed to the great; and it is supposed that really he was through his whole life straitened in financial resources. From Rome, his reputation rapidly extended to the provinces; and even in Britain his *Epigrammata*, which, divided into 15 books, now form his extant works, were read. These books, arranged by himself for publication, were written in the following order: the first 11 (as well as the *Liber de Spectaculis*, which precedes the numbered books) were composed at Rome, with the exception of the third, written during a tour in Gallia Togata; the 12th was written at Bilbilis; and the 13th and 14th at Rome, under Domitian. The last two, entitled *Xenia* and *Apophoreta*, describe, in distichs, the various kinds of *souvenirs* presented by the Romans to each other on holidays. To the other books also we are indebted for much of our knowledge of the manners and customs prevalent under Emperors Nero, Galba, Otho, Vespasian, Titus, Domitian, Nerva, and Trajan, under whose collective reigns Martial spent so many years in Rome. His works have great literary value, as embodying the first specimens of what we now understand by epigram—not a mere inscription, but a poem of two or more lines, containing the terms of an antithesis, which goes off with a repercussion at the close. The wonderful inventiveness and facility displayed by Martial in this species of composition have always received the highest admiration, qualified only by his disgusting grossness, which, blameworthy in him, was even more blamable as an almost universal feature of that age. The best editions of Martial are those of Schneidewin and Friedländer, while in English we have an edition of selected epigrams by Stephenson (1887).

MARTIAL LAW: properly, that military rule which in time of war is conferred by the laws of war in relation to persons and things within the scope of active military operations; and which for the time suspends civil rights and the remedies founded on them, so far as it may appear necessary to the accomplishment of the purpose of the war. Martial law is sometimes applied also loosely as a collective name for those laws to which the individuals composing the military and naval forces of a country are subject, but which do not apply to civilians; more properly called military law (see ARTICLES OF WAR: MUTINY ACT). As, however, the soldier remains a citizen, he is governed by the common law in all matters not coming under cognizance of the martial law, the degree to which the latter is applicable to his actions varying in different countries, and in times of

peace and war. In France and Austria, a soldier's offenses against the civil code are dealt with by a court-martial; while among British troops—unless serving against an enemy—the civil tribunals deal with non-military offenses.

An important phase of martial law concerns the degree of severity which may be applied to an enemy. All authorities agree that the life of an enemy taken in arms is forfeit to his captor; but modern ideas preclude his being put to death, unless in open resistance; and the massacre of prisoners in cold blood, formerly thought lightly of, is now deemed a barbarity, which nothing but the most urgent circumstances, such as their uprising, or their attempted rescue by their countrymen, could justify. The slaughter of the captive Mamalukes at Jaffa has left an indelible stain on Napoleon's memory. As regards civil population and property, much amelioration of martial law has taken place with advancing civilization. Formerly, the devastation of the country, and the destruction, accompanied even by torture, of the inhabitants, was deemed a legitimate feature of war. Now the rule is to spare private property, to respect personal liberty, unless the inhabitants directly or indirectly aid the enemy, and to lay waste only so much ground as military necessities may require. Such at least is the principle professed; though few commanders are able to prevent their troops from occasional deeds of violence. Still another application of the term martial law is to what may be called military government, when a province or town is occupied by a hostile army. This means that civil law is suspended, and all government is under military regimen; but it is impossible to define the bounds of this martial law; nor is any more correct dictum on the subject likely to be arrived at than the celebrated saying of the Duke of Wellington when he described it as 'the will of the commander-in-chief.'

It is evident that martial law in all its applications (excepting that of army regulations, referred to above as military law) is in its nature arbitrary and open to great abuse. It supersedes civil law and civil rights; and its only, but sufficient, justification is paramount necessity. Its rudeness, promptness, and frequent violence of procedure, are in accordance with the whole terrible nature of war itself. In the United States the principle of the rightful existence of martial law under certain circumstances is universally conceded; though some indefiniteness attaches to some of its relations to civil law while in operation, and to the subsequent accountability for certain classes of acts performed under its dictates.

MARTIN, n. *mâr'tĭn* [named after St. *Martin;* or simply a nickname application of the common name *Martin:* F. *martin* and *martinet*]: bird of the swallow kind. See SWALLOW.

MAR'TIN IV. (NICHOLAS DE LA BRIE), Pope of Rome: about 1210—1285, Mar. 25 (pope 1281-5); b. Touraine, France. His name is known in connection with the memorable tragedy of the 'Sicilian Vespers.' Having been from the time of his election a devoted adherent of Charles of Anjou, he supported that monarch with all his influence, and even by the spiritual censures which he had at his command, in his effort to maintain French domination in Sicily; and it is to his use of the censures of the church in that cause that many Roman Catholic historians ascribe the decline and ultimate extinction of the authority in temporals which the papacy had exercised under the distinguished pontiffs who preceded him. His excommunication of Michael Palæologus rendered finally impossible the union of the Eastern and Western churches. He died at Perugia.

MARTIN V. (OTTO DI COLONNA), pope of Rome: about 1368—1431, Feb. 20 (pope 1417-31); of one of the oldest and greatest families of Rome. On the deposition of John XXIII., and the two rival popes, Gregory XII. and Benedict XIII., in the Council of Constance, Cardinal Colonna was elected: this ended the great schism of nearly 40 years (see SCHISM, WESTERN). He presided in all the subsequent sessions of the council, and the Fathers having separated without discussing the questions of reform, at that period earnestly called for in the church, Martin undertook to call a new council for the purpose. It was summoned to meet at Siena, and ultimately assembled at Basel in the year of his death. Martin had learning, capacity, honesty, and moderation; but did not improve his opportunity for reforms in the church.

MAR'TIN, ALEXANDER, LL.D.: 1740—1807, Nov.; b. New Jersey: statesman. He graduated at the College of New Jersey 1756; studied law, and was admitted to the bar; settled in Guilford co., N. C., 1772; was a member of the colonial assembly and several popular conventions 1774-5; appointed colonel 2d North Carolina regiment 1776, and with it served at Germantown and on the Brandywine; member state senate 1779-82, 1785-9, several times its president; acting governor 1781; elected governor 1782 and 1789; member federal constitutional convention 1787; and United States senator 1793-9. He received his degree from the College of New Jersey 1793; became a trustee of the University of North Carolina, and published several poems.

MARTIN, *mâr-tăng'*, BON LOUIS HENRI: French historian and novelist, 1810—1883, Dec. 14; b. St. Quentin; was educated as a notary, but entered on a literary career 1830. His first productions were novels and historical romances. He planned a history of France which should consist of extracts from histories and chronicles, connected by explanatory paragraphs from different writers; but soon resolved on a more original work—his now

well-known and standard *History of France* (Paris, 15 vols. 1833-6). A third ed., much improved, appeared 1837-54; fourth ed. 1855-60. Martin acted for a time as maire of one of the arrondissements of Paris; and was chosen deputy for Aisne 1871, when he voted with the Left. He was elected a member of the French Academy. He wrote several minor histories, e.g., *Histoire de Soissons* (1857), *Daniel Manin* (1859), *Jeanne D'Arc* (1875); and was a regular contributor to liberal periodical literature. The third ed. of his large history contained a new copious statement of the history and origin of the ancient Gauls, the development of the French language and literature, and the aspects of mediæval life and manners. It is without doubt the best work dealing in detail with the history of France as a whole. It shows impartiality and insight, is excellently arranged, and admirably written.

MARTIN, François Xavier: American jurist: b. Marseilles, France, 1764, Mar. 17; d. New York, 1846, Dec. 11. He emigrated to Martinique when 18; later removed to New Berne, N. C.; taught French there and became a printer; studied law, being admitted to the bar about 1789; and in 1792 was requested by the state legislature to compile the British statutes in force before the Revolution. He was himself a member of the assembly in 1806-7; was judge of the Mississippi Territory in 1809; went to Louisiana in the same capacity in 1810; and in 1813 became attorney-general of the new state of Louisiana. From 1815 until just before his death Martin was a member of the supreme court of the state. Although blind for the last 10 of these 31 years, his ability was not impaired, and it is due to him that the law of the state was in some measure evolved from the tangle of French and Spanish statutes in which he found it. He wrote a *History of North Carolina* (1829); *History of Louisiana* (1827), and a version of Pothier on Obligations.

MARTIN, Henry Austin: American surgeon: b. London 1824, July 23; d. Boston 1884, Dec. 7. He came to the United States at an early age and was graduated from the medical school at Harvard in 1845, when he established a practice in Boston. He served as a surgeon until nearly the close of the Civil war, when he resigned and was brevetted lieutenant-colonel for gallant service. He devoted his attention principally to surgery and to the treatment of smallpox, upon which subject he was a generally recognized authority. He was the originator of many important innovations in the field of surgery and published valuable professional articles in periodicals.

MARTIN, Homer Dodge: American painter: b. Albany, N. Y., 1836, Oct. 28; d. St. Paul, Minn., 1897, Feb. 12. He was elected a member of the National Academy of Design in 1875; and resided in France in 1882-6. While he was influenced somewhat by the

Barbizon school of painters, he developed a style entirely his own, which placed him among the best known of American landscape painters. His works include: *Landscape on the Seine; An Equinoctial Day; Brook in the Woods; In the Adirondacks; Sand Dunes on Lake Ontario;* and *White Mountains, from Randolph Hill.*

MAR'TIN, JOHN: an English painter, 1789, July 19—1854, Feb. 17; b. Haydon Bridge, near Hexham, Northumberland. He went to London 1806, and made his first appearance as an exhibitor at the Royal Academy 1812. His picture, entitled *Sadak in Search of the Waters of Oblivion,* attracted much notice. It was followed within two years by the *Expulsion from Paradise, Clytée,* and *Joshua Commanding the Sun to Stand Still.* This last, though popularly successful, was the cause of a quarrel with the academy, which cut him off from any of its honors. Till near the close of his life, he painted pictures in a style considered 'sublime' by the sort of people who thought Montgomery's *Satan* and Pollok's *Course of Time* equal to *Paradise Lost.* The principal of these sublime productions are *Belshazzar's Feast* (1821); *Creation* (1824); *The Deluge* (1826); *The Fall of Nineveh* (1828); *Pandemonium* (1841); *Morning* and *Evening* (1844); *The Last Man* (1850). Martin died of paralysis while painting in the Isle of Man.

MARTIN, JOSIAH: English colonial governor in America: b. probably in Antigua, West Indies, 1737, Apr. 23; d. London, England, 1786, July. He rose to the rank of lieutenant-colonel in the British army in 1771, and in the same year was appointed to the royal governorship of North Carolina. He was successful in pacifying the 'regulators,' many of whom remained zealous Tories; and took a firm and energetic attitude in the maintenance of British authority. But on Apr. 24, 1775, he was compelled to escape to the sloop *Cruiser,* from which on Aug. 8 he issued a prodigiously long proclamation which the Whigs ordered burnt by the hangman. He was with Sir Peter Parker at Charleston (1776, June), and accompanied Cornwallis into North Carolina after the British victory over Gates at Camden; but in 1781, Mar., withdrew to Long Island, and thence went to England.

MARTIN, LUTHER: American lawyer: b. New Brunswick, N. J., 1748, Feb. 9; d. New York, 1826, July 10. He was graduated from the College of New Jersey (Princeton) in 1766; studied law at Queenstown, Md., was admitted to the Maryland bar in 1771; in 1774 was one of the commissioners appointed to oppose the claims of Great Britain; in 1778 became attorney-general of Maryland; and in 1787 was a delegate from Maryland to the convention that framed the constitution of the United States. His opposition to the instrument was so strong that, rather than sign it, he left the convention, thus earning from Jefferson the sobriquet of 'the Federal

bull-dog.' In 1804 he defended Samuel Chase (q.v.) in the latter's impeachment trial before the Senate, and in 1805 resigned his attorney-generalship and resumed private practice. He was counsel for Burr in Burr's trial at Richmond in 1807, in 1814-6 was chief judge of the Baltimore court of oyer and terminer, and in 1818-20 was again attorney-general of Maryland. Among his writings was the series of pamphlets, *Modern Gratitude* (1801-2). Consult Goddard, *Luther Martin* (1887).

MAR'TIN, SAINT: Bishop of Tours: about 316—about 400; b. Sabaria, in Pannonia, of heathen parents. He was educated at Pavia, and at the desire of his father, who was a military tribune, entered the army, first under Constantine, afterward under Julian the Apostate. The virtues of his life as a soldier are the theme of more than one interesting legend. On obtaining his discharge from military service, Martin became a disciple of Hilary, bishop of Poitiers (q.v.). He returned to his native Pannonia, and converted his mother to Christianity, but he himself endured much persecution from the Arian party at that time dominant; and in consequence of the firmness of his Christian profession, he is the first who, without suffering death for the truth, has been honored in the Latin Church as a confessor of the faith. On his return to Gaul, about 360, he founded a convent of monks near Poitiers, where he led a life of great austerity and seclusion; but 371 he was drawn by force from his retreat, and ordained bishop of Tours. The fame of his sanctity, and his repute as a worker of miracles, attracted crowds of visitants from all parts of Gaul; and to avoid the distraction of their importunity, he established a monastery near Tours, in which he resided. He died at Candes. His life by his contemporary, Sulpicius Severus, is a very curious specimen of the Christian literature of the age, and in the profusion of miraculous legends with which it abounds, might take its place among the lives of the mediæval or modern Roman Church. The only extant literary relic of Martin is a short *Confession of Faith on the Holy Trinity*, published by Galland, VII. 559. In the Roman Catholic Church, the festival of his birth is celebrated Nov. 11; and he is regarded as the patron saint of France. In Scotland, this day is one of the quarter-days for paying rent, and it marks the winter-term, called *Martinmas* (the mass of St. Martin). St. Martin's day took the place of an old pagan festival; and formerly in parts of Germany, and elsewhere, people used to begin St. Martin's day with feasting and drinking; hence the French expressions *martiner* and *faire la St. Martin*, 'to feast.' A curious result has been that St. Martin has been regarded as the patron saint both of jovial meetings and of reformed drunkards.

MAR'TIN, Sir THEODORE, LL.D.: author: b. Edinburgh, 1816, Sept. 16. He was educated at the high school, and

studied law at the University of Edinburgh. In 1846 he became a parliamentary solicitor in London. He edited Sir Thomas Urquhart's translation of Rabelais' *Gargantua and Pantagruel* (1838). In 1845 appeared *Bon Gaultier Ballads,* joint production of Martin and Prof. Aytoun; his translation of *Poems and Ballads of Goethe* (1858); *Danish Dramas* (1857); *Odes of Horace* (1860; enlarged ed. 2 vols. 1882); Dante's *Vita Nuova* (1862); *Faust* (1865); *Life of H. R. H. the Prince Consort,* 5 vols. (1874-80). In 1880 Martin was made a K.C.B., in 1896 K.C.V.O., received the degree LL.D. from Edinburgh, and was elected rector of the University of St. Andrews. He has since published a volume on the Shakespeare-Bacon controversy; *Life of Lord Lyndhurst;* a translation of Schiller's *Song of the Bell;* a translation of the first six books of Virgil's *Æneid* (1896); *Helena Faucit, Lady Martin* (1901); a translation of Leopardi's *Poems* (1905); etc. He accompanied the queen to Wales by invitation 1889.

MARTIN, WILLIAM ALEXANDER PARSONS, D.D., LL.D.: American educator: b. Livonia, Ind., 1827, Apr. 10. He was graduated from the Indiana State University and studied theology. He went to China as a missionary in 1850 and has spent the greater share of his life there engaged in educational and missionary work. He assisted in making the treaty between the United States and China in 1858, and was an authority in China on questions of international law. He was professor and president of Tung Wen College 1868-98, and then president of the New Imperial University until 1900, when it was destroyed in the siege of Peking, in which city he was imprisoned with the American legation. In 1902 he was appointed president of the University of Wuchong. He has edited in Chinese the *Peking Scientific Magazine,* and the *Science Monthly,* and has published: *Siege in Peking* (1900); *Chinese Legends; The Lore of Cathay* (1901); *The Awakening of China* (1907); etc.

MARTINDALE, *mâr'tĭn-dāl,* JOHN HENRY: 1815, Mar. 20—1881, Dec. 13; b. Sandy Hill, N. Y.: soldier. He graduated at the United States Military Academy 1835; resigned 1836; studied law, was admitted to the bar, and began practicing in Batavia, N. Y., 1838; was district attorney of Genesee co. 1842-5 and 1847-51; practiced in Rochester 1851-61; appointed brigadier-general of volunteers 1861, Aug. 9; distinguished himself as brigade commander during the Peninsular campaign 1862; military governor of the District of Columbia 1862, Nov.—1864, May; commanded a division in the operations south of Richmond and the siege of Petersburg; and commanded the 18th army corps on the Appomattox line till forced to resign by ill-health 1864, Sept. 13. He was brevetted major-general of volunteers for Malvern Hill; was attorney-general of New York 1866-8, and vice-

president of the board of managers of Soldiers' Homes many years.

MARTINEAU, *mâr'tė-nō*, HARRIET: English authoress: 1802, June 12—1876, June 27; b. Norwich; of Huguenot extraction; sister of James Martineau. Her education was conducted mostly at home: as a girl she was a lover of books, and amused her solitary hours by committing her thoughts to paper. The deafness which she suffered from her youth, and which became confirmed about her 20th year, no doubt strengthened her habits of study, and had much to do with the working out of her career. The life in her home has been characterized as 'industrious, intellectual, and austere.' She appeared in print (in a religious Unitarian periodical, the *Monthly Repository*) while still young, and when, 1829, she and her sisters lost their small possessions by the failure of the house in which their money was placed, she continued to write, but under the new necessity of earning a livelihood. Her first volume, *Devotions for Young People*, appeared 1823; followed 1824 by *Christmas Day*, a tale; and by *The Friend*, a sequel (1825). In 1826, she published *Principle and Practice*, and *The Rioters;* and for two years thereafter she was busily engaged writing stories and a series of tracts on social matters, adapted mainly for working-people. In 1830, she produced *Traditions of Palestine*, and the Association of Unitarian Dissenters awarded her prizes for essays on the following subjects: *The Faith as unfolded by many Prophets, Providence as manifested through Israel*, and *The Essential Faith of the Universal Church.* Her next important literary venture, *The Illustrations of Political Economy*, a series of tales, met great and deserved success; and was followed by *Taxation*, and by *Poor-Law and Paupers.* In 1834, she crossed the Atlantic, and published *Society in America* (1837). Her brave and strong advocacy (in the *Westminster Review*) of the despised Abolitionist cause in the United States gave deep offense on both sides of the sea. In 1839 she published *Deerbrook*, and 1840, *The Hour and the Man.* She afterward produced a series of tales for the young, the best known of which are *Feats on the Fiord*, and *The Crofton Bogs.* During 1839-44, when she was more or less an invalid, she wrote *Life in the Sick-room.* Her recovery she attributed to mesmerism, an avowal which was the cause of a fierce discussion in the scientific world, and exposed her to much ridicule. On her recovery she published *Forest and Game-Law Tales.* In 1846, she visited Palestine, and collected materials for *Eastern Life, Present and Past*, which she published on her return. Afterward, she completed Knight's *History of England during the Thirty Years' Peace.* In 1851, in conjunction with H. G. Atkinson, she published a series of *Letters on the Laws of Man's Social Nature and Development*, and 1869, *Biographical Sketches* (collected from the *Daily News*). The

long catalogue of her literary labors (she wrote more than 100 books) includes her translation of Comte's *Positive Philosophy; Household Education; Health, Husbandry, and Handicraft*, etc. Miss Martineau was a constant contributor to the large reviews and the daily and weekly press. Her *Autobiography*, written and printed many years before, was published with additional editorial vol. 1877.

MARTINEAU, JAMES: English Unitarian clergyman and philosopher: b. Norwich, 1805, Apr. 21; d. London 1900, Jan. 11. His father, Thomas Martineau, the great-grandson of a Huguenot surgeon who left France after the revocation of the Edict of Nantes, was a manufacturer of bombazines. Harriet Martineau (q.v.) was an elder sister. He was sent to Derby in 1821 to study civil engineering, but in the following year became a student of Manchester College, now at Oxford, then at York. On the completion of his college course in 1827 he took charge for a year of Dr. Lant Carpenter's school in Bristol, and in 1828 he accepted a call to the co-pastorship of Eustace Street Presbyterian Church, Dublin. In 1831 he published *Hymns for Christian Worship*, and next year resigned his pastorate, but shortly afterward accepted the co-pastorate of Paradise Street Chapel, Liverpool, of which, in 1835, he became sole pastor. In 1836 appeared his first separate original work, *The Rationale of Religious Inquiry*, which attracted considerable attention. In 1839 he was associated with J. H. Thom and Henry Giles in the defense of Unitarianism against attacks by orthodox clergymen, and of the 13 addresses published in *Unitarianism Defended* (1839) five were by Martineau. In 1840 he published his collection of *Hymns for the Christian Church and Home*, and in the same year was appointed professor of mental and moral philosophy and of political economy in his old college, now located in Manchester and named Manchester New College. On the removal of the college to London in 1853 he retained his professorship, but did not settle in London till 1857. In 1848-49 he spent 15 months on the continent, mostly in Germany, during which his philosophical opinions were profoundly influenced by the study of Greek and German philosophy under Trendelenburg. The remaining publications of his first Liverpool period are an essay on *The Five Points of Christian Faith* (1841), and the well-known collection of sermons entitled *Endeavors after the Christian Life* (1843-47). During the period 1849-57, when he was pastor of Hope Street Church, Liverpool, he published many articles in reviews, among them that on *Mesmeric Atheism*, which finally completed his sister Harriet's estrangement from him. In 1859, being now in London, he and J. J. Taylor, principal of Manchester New College, were chosen joint ministers of Little Portland Street Chapel, but from 1860 till his resignation in 1872 Martineau alone supplied the pulpit. On

Taylor's death in 1869 he became principal of the college, a post which he held till his resignation in 1885. In 1866 he was a candidate for the chair of logic and mental philosophy in University College, London, but the united opposition of orthodoxy and secularism led by George Grote managed to defeat him by a single vote. His publications during his connection of 28 years with Manchester New College in London comprise: *Studies of Christianity* (1869), a volume of sermons; *Why Dissent?* (1871); *Hymns of Praise and Prayer* (1873); *Religion as affected by Modern Materialism* (1874); *Modern Materialism: Its Attitude towards Theology* (1876), a masterly attack on Tyndall and the scientific materialists; *Essays, Theological and Philosophical* (1875); *Hours of Thought on Sacred Things* (1876-80), a collection of the sermons of his maturer period; *Ideal Substitutes for God Considered* (1880), a criticism of Moral Idealism; *The Relation between Ethics and Religion* (1882); *A Study of Spinoza* (1883), his first great philosophical work; and *Types of Ethical Theory* (1885), the earlier of his two masterpieces. During the remaining years of his life he published his great defense of the essential principles of religion entitled *A Study of Religion: Its Sources and Contents* (1888); and his freely critical *Seat of Authority in Religion* (1890); besides a volume of *Home Prayers with Two Services for Public Worship* (1891), and a collective edition in four vols. of many of his *Essays, Reviews, and Addresses* (1891). The first academical degree conferred upon him was that of LL.D. by Harvard in 1872, but he received later the degrees of S.T.D. from Leyden (1875), D.D. from Edinburgh (1884), D.C.L. from Oxford (1888), and LITT.D. from Dublin (1892). Martineau was one of the most eminent preachers of his time, but his greatest work was done in the fields of ethics and philosophical theology. At first a necessarian and utilitarian, he was latterly the greatest modern champion of free-will and intuitionalism. In the development of his Christology from a sort of Arianism to complete Humanitarianism, and in his ever-increasing insistence upon the continuity of revelation and the purely internal character of ultimate religious authority, he sums up more than any other the history of Unitarianism, and indeed of liberal theology generally during the 19th c. He was a powerful and eloquent champion of Theism against scientific agnosticism and materialism. All his works are written in a uniquely rhythmic style, characterized by a profuse and happy use of figurative language. Consult: Jackson, *James Martineau: A Biography and a Study* (1900); Sidgwick, *Lectures on the Ethics of Green, Spencer and Martineau* (1902); Drummond, *Life and Letters of James Martineau;* and Upton, *A Survey of Philosophical Work* (1902).

MARTINELLI, *mâr-tĭ-nĕl'ĭ*, SEBASTIAN, Monsignor: papal apostolic delegate to the United States: b. in parish of Santa Anna, near Lucca, province of Tuscany, Italy, 1848, Aug. 20. At the age of 15 he entered the order of Augustinians; made his solemn profession 1865; was ordained to the priesthood 1871. He became a consultor in the Congregation of the Holy Office. In 1889, without having passed through the offices of prior and provincial, he was nominated prior-general of the Hermits of the Order of St. Augustine. In 1894 he presided over the chapter of the Augustinian Order which was held in Bryn Mawr, Pa., and visited Ireland in 1891 to preside over the Irish chapter of that order. In 1896 he was chosen by Pope Leo XIII. to succeed Cardinal Satolli as apostolic delegate in the United States; in 1901 was elevated to the cardinalate; and was recalled 1902.

MARTINET, n. *mâr'tĭn-ĕt:* in *milit. language,* a strict disciplinarian; a teasing pedant in the minutiæ of dress and discipline—a term derived from General *Martinet,* of the time of Louis XIV. of France. *Note.*—The word may be a dim. of *Martin,* formerly the name for an ass.

MARTINETS, n plu. *mâr'tĭn-ĕts* [F. *martinet*]: small lines fastened to the back of a sail.

MARTINGALE, n *mâr'tĭn-gāl* [F. *martingale*—from *Martigues* in Provence, the inhabitants having been the first to wear stockings *à la martingale:* It. *martingala,* an old kind of hose]: a strap passing from the nose-band of a horse, between the fore legs, to the girth; part of a ship's rigging.

MARTINIQUE, *mâr-tĭ-nēk':* West Indies, an island of the Lesser Antilles, and, except Guadeloupe, the largest in the Caribbean chain. Area, 381 sq.m. It is very mountainous (Mt. Pelée, in the n.w., 4,450 ft.; Mt. Carbet but a little lower, while a peak near the southern coast rises to the height of 3,950 ft.). The thermometer ranges between 76° and 88° F., the summers being hot and dry, autumn and a part of winter hot and rainy, and spring comparatively cool. In 1901 the inhabitants numbered 203,781. About 3 per cent. were Caucasians, who resided chiefly in St. Pierre; the balance of the population—those who, in the main, suffered least from the disaster of 1902—are described as negroes, mulattoes, 'copre, chabin, and matés'—that is, blends of the African, Carib Indian (q.v.), Mongolian, and French races. A large part of the surface is covered with forests of silk-cotton, species of mahogany, etc. The flora is closely related to that of South America; the fauna abounds in minor reptiles and insects. Of the snake kind the most dreaded is the fer-de-lance, whose bite is fatal. The principal crop is sugar, and in former years about 60,000 tons were produced annually; but the output has fallen to 25,000 or 28,000 tons. Attempts to

raise coffee and cacao on a large scale have not been successful. The total foreign trade is about $11,000,000 annually, nearly equally divided between exports and imports. Martinique is a colony of France, sending one senator and one deputy to the French legislature. Its affairs are administered by a governor and general council. Educational institutions are: a law school at Fort de France, several secondary or normal schools, and about 100 primary schools. The island was acquired by the French in 1635. Toward the close of the 18th and beginning of the 19th c. it was temporarily held by the British. In 1902, May, volcanic eruptions from Mt. Pelée (q.v.) destroyed St. Pierre, which was the largest city on the island, with a population of 26,011, and the residents of that place perished, almost without exception; but the statement commonly made, that 'a great part of the island was overwhelmed,' is incorrect. The scope of Pelée's work was limited. About 10,000 persons besides those in St. Pierre lost their lives (in all, 20 per cent. of the total population); the best agricultural regions, however, in the south and along the eastern coast, were uninjured. The capital, Fort de France (population 22,164), is situated in the s.w., and is important as being the military and naval headquarters and rendezvous in the French Antilles; the terminus of the French transatlantic steamers and West Indian cable system. A statue of the Empress Josephine, who was born in Martinique, is one of the ornaments of the public gardens of Fort de France. The military force consists of over 1,100 French soldiers. The capital has had its share of misfortunes in the past: it was nearly consumed by fire in 1890, and partially destroyed by an earthquake in 1839.

MAR'TIN MAR PREL'ATE, Controversy of: based on seven tracts secretly published in England between 1588, Nov., and 1589, July, by 'Martin Mar Prelate, Gentleman,' in which the queen, bishops, and all the clergy of the English Church were attacked, 'assailed with every kind of contumely.' Whoever the author was, he vigorously defended in them the most extreme independency; and the secrecy of their publication and boldness of language obtained for them a wide circulation. The name of the alleged author was unquestionably fictitious. Various, but uniformly unsuccessful, efforts were made to establish the authorship. Messrs. Udal and Penry, both Independent ministers, were charged with the authorship and tried, but neither would make any disclosures. In Dexter's *Congregationalism as Seen in Its Literature*, the author ascribes their authorship to Henry Barrowe and their publication to John Penry.

MARTINMAS, n. *mâr'tĭn-mas* [*Martin*, and *mass*]: St. Martin's day (Nov. 11); also the winter term then beginning. See Martin, Saint (bishop of Tours).

MARTINSBURG, *mâr'tĭnz-bĕrg:* city, county seat of Berkeley Co., W. Va.; on the Cumberland Valley and the Baltimore & Ohio railroads; about 65 m. n.w. of Washington, D. C. It is in the vicinity of valuable stone quarries and forests which furnish timber for many mills. The chief manufactures are hosiery, woolen goods, lime, wagons, lumber, and canned goods. The repair shops of the Baltimore & Ohio railroad and slate and limestone quarries furnish employment for a number of people. The chief buildings are the government building, which cost $100,000; the Berkeley Female Seminary, the Berkeley Female Institute, and the King's Daughters' Hospital. The waterworks are owned and operated by the municipality. Pop. (1900) 7,564. Martinsburg, as the chief city of the lower Shenandoah valley, on the main road leading across the Potomac, the converging point of several roads, with the Baltimore & Ohio railroad running through it, was an important point in the military operations of the valley during the Civil war. Then it was in Virginia. Early in July, 1861, Gen. Patterson, after a slight skirmish, occupied the place, the Confederates falling back to Winchester. Patterson soon abandoned it, and it was reoccupied by the Confederates. Early in March, 1862, it was again occupied by the Union forces under Gen. Banks, the Confederates falling back up the valley. It was abandoned 1862, May 25, after Banks' defeat at Winchester, but soon reoccupied by Banks. On Sept. 8, 1862, Gen. Julius White was in command of the place with about 2,500 men of all arms. At this time Gen. Lee had crossed the Potomac and was at Frederick, Md. On the 10th Jackson led a column from Frederick, crossed the Potomac at Williamsport, and moved on Martinsburg. White retreated during the night of the 11th to Harper's Ferry. In 1863, June, when Ewell's corps moved down the valley in the Gettysburg campaign the place was held by Col. B. F. Smith with 1,200 infantry and a battery. On June 13 Ewell, at Cedarville, detached Jenkins' cavalry brigade and Rodes' infantry division to surround and capture the Union forces at Berryville and Martinsburg. Both garrisons escaped, Smith, with the greater part of his infantry, crossing the Potomac at Shepherdstown and making his way to Maryland Heights. The battery retreated by the Williamsport road, was pursued, and lost five of its six guns, with 200 infantry accompanying it. On July 1, 1864, the place was held by Gen. Sigel with about 3,200 infantry and dismounted cavalry, and a battery. On the 2d Early arrived at Winchester on his campaign to menace Washington and, under Gen. Lee's instructions, first to clear out the lower valley and wreck the Baltimore & Ohio railroad. Parties were sent n. and w. against the railroad, and on the 3d Bradley T. Johnson, with a cavalry brigade, was ordered to move through Smithfield and Lee Town, cross the railroad at Kearnys-

ville, e. of Martinsburg, and, pushing n., unite with McCausland at Hainesville beyond Martinsburg. Johnson arrived at Lee Town early in the morning, where he was met by Col. J. A. Mulligan with about 2,000 men and a battery, and after a hard fight was driven back on the divisions of Rodes and Ramseur, which were supporting him. Breckinridge's division, which marched on the main road to Martinsburg, drove before it Stahel's cavalry, on outpost at Darkesville. Sigel, warned of approaching danger, burned his stores, collected his command, and, leaving Martinsburg on the night of the 3d, crossed the Potomac at Shepherdstown and occupied Maryland Heights. Early cleared the valley and advanced on Washington, and on the 11th Martinsburg was occupied by Sullivan's division of Hunter's command, and remained in Union occupation until the 25th, when Crook, being defeated by Early at Kernstown, was driven through Winchester, made a short stand at Martinsburg, and recrossed the Potomac at Williamsport. Early again occupying the town and destroying the railroad on either side of it, and continuing in possession until Aug. 10, when, upon Sheridan's advance to Halltown, he abandoned Martinsburg and Winchester and fell back to Strasburg. He advanced from Strasburg on the 17th and reoccupied Martinsburg on the 19th with his cavalry. From this time until Sept. 17 the place was held alternately by Union and Confederate cavalry, on the 17th by Averell's Union division. On that day Early left Winchester with a heavy force of infantry, cavalry, and artillery, and on the 18th attacked and drove Averell from Martinsburg across the Opequon. Sheridan defeated Early on the Opequon on the 19th, and drove him up the valley; and Martinsburg was again occupied by Union troops, to remain in their possession until the close of the war. Pop. (1910) 10,698.

MAR'TIN'S FERRY, city, in Belmont co., O.; on the Ohio river, and on the Pennsylvania, the Cleveland, L. & W., the Wheeling B. & T., and the Wheeling & L. E. railroads; almost opposite Wheeling, W. Va. The first settlement was made in 1769 and in 1865, nearly a century later, it was incorporated as a village. The charter under which it is now governed was granted in 1885. It is situated in a region noted for its abundance of bituminous coal, iron, and limestone. The chief manufactures are iron, steel, stoves, shovels, nails, glass, tin, machine-shop products, lumber, barrels, and boxes. The city owns and operates the electric-light plant and the waterworks. Pop. (1900) 7,760; (1910) 9,133.

MARTIUS, *mâr'tsē-ûs*, Carl Friedrich Philipp von: German botanist and traveller in Brazil: 1794—1868; b. Erlangen. He studied medicine at Erlangen; and 1817 went to Brazil as member of a scientific expedition sent out by the Austrian and Bavarian governments. These works are: *Reise nach Brasilien* (3 vols. Munich 1824-31);

Nova Genera et Species Plantarum (3 vols. Munich 1824-32); *Icones Plantarum Cryptogamicarum* (Munich 1828-34). He published also a most valuable monograph of palms, *Genera et Species Palmarum* (3 vols. Munich 1823-45). He is author also of works on tropical America, e.g., *Die Pflanzen und Thiere des tropischen Amerika* (Munich 1831); *Das Naturell, die Krankheiten, das Arztthum, und die Heilmittel der Urbewohner Brasiliens* (Munich 1843); *Systema Materiæ Medicæ Vegetabilis Brasiliensis* (Leip. 1843). He was professor of botany and director of the Botanic Garden at Munich.

MARTLEMAS, n. *mârt'l-măs:* a corrupt OE. spelling for MARTINMAS.

MARTLET, n. *mârt'lĕt* [F. *martinet*, a dim. of *Martin*, a martin]: kind of swallow; in *her.*, a fanciful bird, shaped like a martin or swallow, with long wings, very short beak and thighs, and (except in the earliest heraldry) no visible legs; given as a mark of cadency to the fourth son; also otherwise used as a charge.

MAR'TY, MARTIN: Roman Catholic bishop: b. Schwyz, Switzerland, 1834, Jan. 12; d. St. Cloud, Minn., 1896, Sept. 19. He received a collegiate education in Switzerland and Austria, was ordained to the priesthood in 1856 and in 1860 came to the United States. He assisted in the founding of a priory at St. Meinrad's, Ind., and was its first superior; through his efforts the priory became an abbey in 1870 and Marty was raised to the rank of mitred abbot. He resigned his office several years later in order to perform mission work among the Indians of Dakota, over whom he gained a wide influence. He mastered their language and wrote a Sioux grammar and dictionary. In 1880 he became the first bishop of Sioux Falls, and in 1894 was transferred to St. Cloud, Minn.

MARTYN, *mâr'tĭn*, HENRY: 1781, Feb. 18—1812, Oct. 16; b. Truro, England: missionary. He graduated at St. John's College, Cambridge, 1801; was chosen fellow 1802; ordained deacon in the Anglican Church 1803; priest 1805; appointed a chaplain of the E. India Company, and sailed for Madras 1805, July 17. He reached Calcutta 1806, Apr., and his first station at Dinapore in Sept. His great work in India was performed at the military stations of Dinapore and Cawnpore, and in the space of less than 4½ years. He readily acquired proficiency in the Hindostanee language, and was thus enabled to labor among the natives, as well as among the soldiers and English residents. He applied himself closely to preparing translations of the Scriptures and other religious works in the vernacular, and by 1807, Feb., he had finished a translation of part of the *Book of Common Prayer*. This was soon followed by a *Commentary on the Parables*. In 1808 he finished an idiomatic Hindostanee version of the New Testament; and the

great utility of this work led influential friends to urge on him the preparation of a Persian version, which he tediously accomplished, but at the cost of his life. His health failing, he determined to return to England to recuperate 1811, but on the way stopped at Shiraz, Persia, where he finished his Persian New Testament 1812, Feb., and spent 6 months in preparing a Persian version of the Psalms. At Shiraz and Tebriz he held public disputations with the doctors of Mohammedan law, and answered the defense of Mohammedanism with a defense of Christianity delivered in the vernacular. He resumed his journey, starting on horseback toward Constantinople, 1,500 m. distant. This journey under the burning sun of Asia Minor proved too much for his frail constitution, further debilitated by fever and ague, and at Tocat, amid strangers, he passed to his eternal reward. His remains were buried in the Armenian cemetery at Tocat, and a monument was erected over them 1823. See *Memoir of Rev. Henry Martyn,* B.D. (London 1819:81); *Sermons of Henry Martyn* (Boston 1822); *Journal and Letters of Henry Martyn* (2 vols., London 1827); and *Henry Martyn* (New York 1881).

MARTYN, WILLIAM CARLOS, D.D., LITT.D.: American Presbyterian clergyman and historical writer: b. New York 1843, Dec. 15. He was graduated from the Union Theological Seminary in 1869, was ordained to the Presbyterian ministry in that year, and has held several important charges, but has devoted his later years to literary work. From 1897-1903 he was director of the Abbey Press. He has published: *Life of John Milton* (1866); *Pilgrim Fathers of New England* (1870); *Wendell Phillips—the Agitator* (1890); *Christian Citizenship* (1896); *Sour Saints and Sweet Sinners* (1898); *Life of Martin Luther; History of the English Puritans; History of the Huguenots; The Dutch Reformation; Lives* of William E. Dodge and John B. Gough; etc.

MARTYN'IA: a genus of annual and perennial herbs of the order *Pedaliaceæ,* or according to some authors, *Bignaniaceæ.* The ten species have tuber-shaped roots; thick sub-erect stems; opposite or alternate heart-shaped leaves; showy catalpa-like flowers in short terminal racemes; and horned capsules which suggest the names unicorn plant and proboscis-flower. When ripe the capsules split and expose numerous black wrinkled seeds. The stems and foliage are clammy and malodorous, but the flowers of some species not unpleasantly perfumed. The species are all natives of warm parts of America, especially of the lower Mississippi valley. They are often planted for ornament, as curiosities, and for their capsules, which while young and tender are used as material for pickles. *M. proboscidea,* to which the popular names are generally applied, is the most commonly grown.

MARTYR, n. *mâr'tẽr* [Gr. *martur*, a witness: It. *martire;* Sp. *martir;* F. and AS. *martyr*, a martyr]: one who bears witness to his belief by suffering persecution or death for it, especially applied to religious belief; one who suffers persecution or death in defense of any cause; one suffering from some very severe bodily disease: V. to subject to extreme persecution, or to put to death, on account of belief or opinions; to torment; to murder. MAR'TYRING, imp. MAR'TYRED, pp. *-tẽrd:* ADJ. persecuted or put to death for one's belief, especially for one's religious opinions. MARTYRDOM, n. *mâr'tẽr-dŭm*, the death or sufferings of a martyr.—*Martyr* is specially the name in ecclesiastical history for those who, by fearless confession of Christ, and especially by fortitude in submitting to death itself rather than deny their Lord, bore the 'witness' of their blood to the superhuman origin of the Christian faith. Of this use of the word, there are examples also in the New Test., Acts xxii. 20; Rev. ii. 13; xvii. 6; though this meaning, as its technical and established signification, is derived mainly from ecclesiastical writers. During the Persecutions (q.v.) of the Christians in the first three centuries, contemporary writers, pagan and Christian, record that many Christians, preferring death to apostasy, became martyrs or witnesses in blood to the faith, often with utmost heroism. The courage and constancy of the sufferers won the highest admiration from the brethren. It was held a special privilege to receive the martyr's benediction, to kiss his chains, to visit him in prison, or to converse with him; and, as it was held that their great and superabundant merit might, in the eyes of the church, compensate for the laxity and weakness of less perfect brethren, a practice gradually arose by which the martyrs gave to those sinners who were undergoing from the church a course of public penance, letters of commendation to their bishop, in order that their course of penance might be shortened or suspended altogether: see INDULGENCE. The day of a martyrdom, moreover, as the day of the martyr's entering into eternal life, was called the 'natal' or 'birth' day, and was celebrated with peculiar honor and special religious services. Their bodies, clothes, books, and other objects which they had possessed were honored as RELICS (q.v.), and their tombs were visited for the purpose of asking their intercession: see INVOCATION. The number of martyrs who suffered death during the first ages of Christianity has been a subject of great controversy. The ecclesiastical writers, with natural pride of partisanship, have, it can hardly be doubted, been led into exaggeration. Some of their statements are palpably excessive; and Gibbon, in his well-known 16th chapter, throws great doubt even on the most moderate computations of the old church historians. But it is clearly though briefly shown by Guizot in his notes on this celebrated chapter (see Milman's *Gibbon's Decline and Fall*, I. 598), that Gibbon's criticisms are founded on unfair and partial data, and that even the authorities on which

he relies demonstrate the fallaciousness of his conclusions. The subject is discussed with much learning and considerable moderation in Ruinart's *Acta Primitiva et Sincera Martyrum.* Considerable difference of opinion also has existed as to what, in exploration of the ancient Christian tombs in the Roman catacombs, are to be considered as signs of martyrdom. The chief signs, in the the opinion of older critics, were (1), the letters B. M.; (2), the figure of a palm-tree; and (3), a phial with the remains of a red liquor believed to be blood. Each of these has been the subject of dispute, but the last is commonly regarded as the conclusive sign of martyrdom. The first recorded martyr of Christianity, called the 'proto-martyr,' was the deacon Stephen, whose death is recorded Acts vi., vii. The proto-martyr of Britain was Alban of Verulam, who suffered under Diocletian 286 or 303.

MARTYROLOGY, n. *mâr'tėr-ŏl'ŏ-jĭ* [Gr. *martur*, a witness; *logos*, a discourse]: history or register of martyrs; calendar of martyrs and other saints arranged in the order of months and days; intended partly to be read in the public services of the church, partly for the guidance of the devotion of the faithful toward the saints and martyrs. The use of the M. is common to the Latin and to the Greek Church, in the latter of which it is called *Menologion* (from *Mēn*, a month) or 'month-calendar,' sometimes *Analogion.* The earliest *extant* Greek M. or menology dates from the 9th c., published 1727 by Cardinal Urbini. The oldest M. known of, was Eusebius's collection of records of persecutions; and his treatise *On the Martyrs of Palestine*, preserved in an anc. Syriac version ed. by Cureton. Next has been placed as the oldest Latin M., the calendar of saints' days attributed to Jerome, published in the 11th vol. of the collected ed. of his works by Vallars; but the genuineness at least of portions of it is more than doubtful. A later M., said to be by Jerome, is merely a rude patchwork, from many ancient church calendars; yet this seems the basis of all martyrologies since in the Western Church. In the mediæval period martyrologies were issued in England by Venerable Bede; in France by Florus, Ado and Usuard; and in Germany by St Gall, Nolter, and Rabanus Maurus. The so-called 'Roman Martyrology' is designed for the entire church, and was published by authority of Gregory XIII., with a critical commentary by the celebrated Cardinal Baronius 1586; a still more critical edition was issued by the learned Jesuit, Herebert Rosweid. MAR'TYROLOG'ICAL, a. *-lŏj'ĭ-kăl*, pert. to martyrs. MAR'TYROL'OGIST, n. *-ŏl'ŏ-jĭst*, a writer of an account of martyrs.

MA'RUM, or MAR'RAM: see AMMOPHILA.

MARUT, *mâ'rût*, Hind. *mŭr'ût:* in Hindu mythology, the god of wind; his wife is Anjanâ, and his son Hanumân (q.v.). Bhîma, the second of the Pân'd'u princes (see MAHÂBHÂRATA), is likewise considered an offspring of this god.

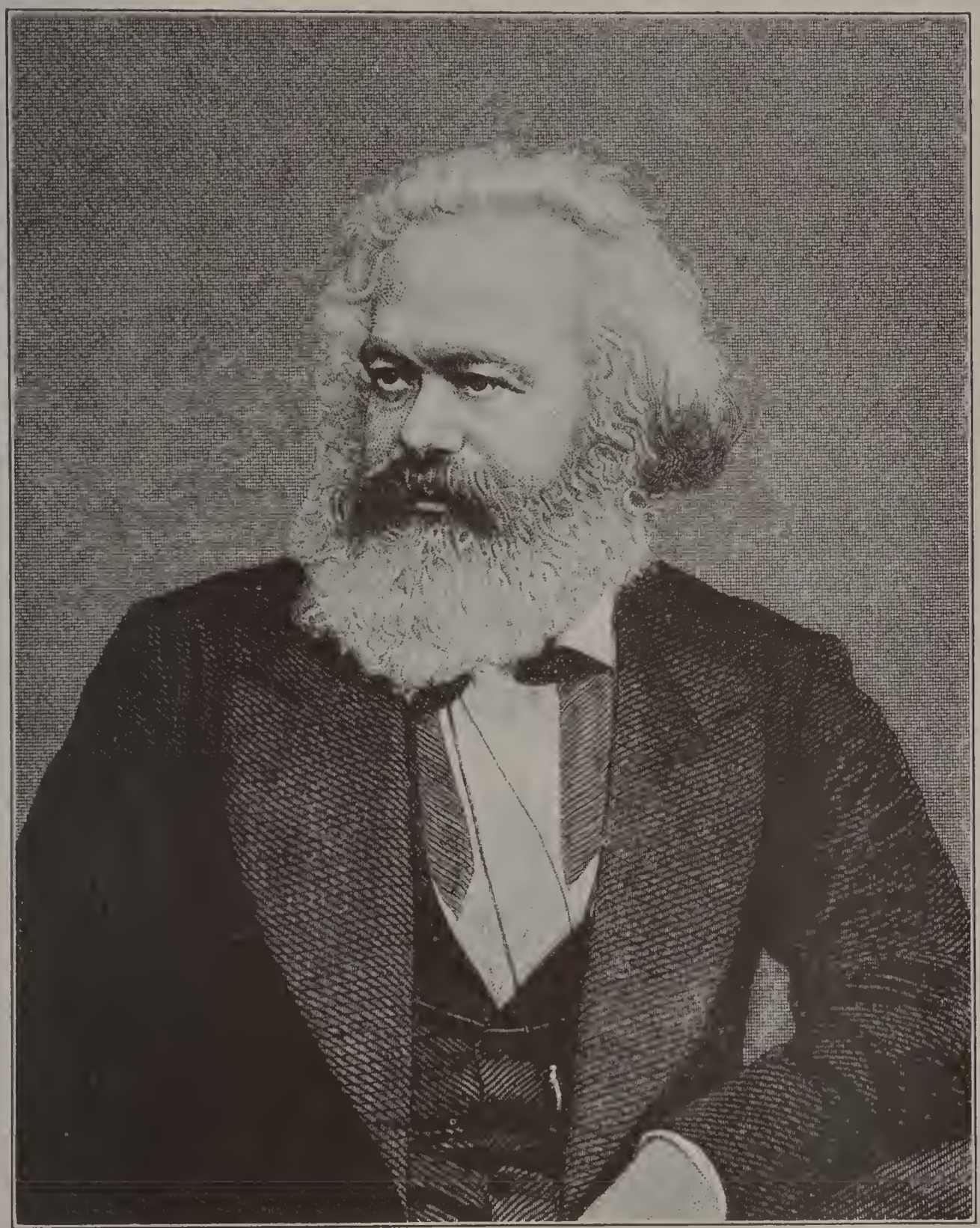
MARVEL, n. *mâr′vĕl* [F. *merveille*, a marvel—from It. *maraviglia*—from L. *mirabĭlĭă*, wonderful things: comp. Gael. *miorbhuil*, a wonder]: something astonishing or wonderful: V. to wonder; to be astonished. MAR′VELLING imp. MAR′VELLED, pp. *-vĕld*. MAR′VELLOUS, a. *-vĕl-ŭs*, wonderful; astonishing; surpassing credit or belief. MAR′VELLOUSLY, ad. *-ŭs-lĭ*. MAR′VELLOUSNESS, n. *-nĕs*, the quality of being wonderful or strange. THE MARVELLOUS, that which exceeds nature, or is improbable.—SYN. of 'marvel, n.': wonder; prodigy; surprise; miracle; monster; admiration; astonishment; incredibility.

MARVELL, *mar′vĕl*, ANDREW: English political writer, and satirist: 1621, Mar. 31—1678, Aug. 16; b. Winestead, Yorkshire; his father being master of Hull Grammar-school and lecturer of Trinity Church. He studied at Trinity College, Cambridge, and spent several years in various parts of the continent, 'to very good purpose,' according to his friend, John Milton. He returned to England 1646; in 1652, was employed by Oliver Cromwell as tutor to his nephew, a Mr. Dutton; in 1657, became assist.-sec. to Milton; and 1658, was chosen by Hull to represent it in parliament. M.'s parliamentary career was both singular and honorable. Without fortune or influence, possessing no commanding talent as a speaker, he maintained a character for integrity, so genuine and high that his constituency felt itself honored by his conduct, and allowed him to the end of his life 'a handsome pension.' Otherwise, it would have occasionally fared ill with this incorruptible patriot, for he was often reduced to great pecuniary straits. He accepted the Commonwealth as the actual government, but never changed his preference for monarchy. Yet in the venal and corrupt period following the restoration, M. refused to join the general chorus of flatterers of the royal proceedings. Charles II. made many fruitless efforts to win M. over to the court-party. The story of the interview between M. and his old school-fellow, the lord treasurer Danby, who had found out the patriot's lodgings (with difficulty) 'up two pair of stairs, in one of the little courts in the Strand,' is believed to be essentially true, and indicates a certain noble republican simplicity of nature. M. was tolerant in religion, broad-minded in politics, and morally pure in a society fearfully corrupt. His writings, partly in verse, and partly in prose, are satirical, sharp, honest, and pithy (like his talk), but they relate to matters of temporary interest, and are now seldom read. The best edition is the Rev. A. B. Grosart's (4 vols. 1872-75).

MARVEL OF PERU: see JALAP.

MARVER, n. *mâr′vĕr* [F. *marbre*, a correcting-stone among printers—from L. *marmŏrem*, marble]: a slab of cast-iron upon which a small quantity of hot glass from the crucible is rolled to give it a regular form, that the glass when blown may have a uniform thickness.

MARWAR′: see JOUDPORE.



KARL MARX,
Foremost Defender of Communism.

MARX, *mârks*, KARL: German socialist: b. Trèves 1818, May 5; d. London 1883, March 14. He was educated at the universities of Bonn and Berlin, and in 1842 took up journalism, becoming editor of the *Rheinische Zeitung*, a democratic journal; his socialistic articles in this paper caused its suppression in 1843. Marx then proceeded to Paris, where he became one of the editors of the *Deutsch-Französische Jahrbücher*, to which he contributed articles on the *Hegelian Philosophy of Right*. He was expelled from France in 1845, and retired to Brussels, where he assisted in organizing the German Workingmen's Association, was also active in the organization of the Communist League, and with Engels issued the famous Communist Manifesto in 1847, which was the first public declaration of international socialism. In 1848 Marx returned to Germany, started the *Neue Rheinische Zeitung*, and was active in the revolutionary movements of that year. Banished from Germany in 1849, he went first to Paris, then to London, where he lived till the time of his death. He devoted himself largely to the study of economic questions, and was correspondent of the New York *Tribune* and other papers. In 1864 he took a leading part in the organization of the International Workingmen's Association (q.v.), and practically shaped its policy for a number of years; he was also interested in the organization of the German Social Democrats, who united with the International in 1869. After 1873 he took no active part in politics, but devoted his time to the completion of his work on capitalism, *Das Kapital* (*Capital*), the first volume of which had been published in 1867 (English translation 1886); the second and third volumes were left in manuscript, and Vol. II. was published in 1885. Vol. III. in 1894, under the editorship of Engel. He also wrote: *Zur Kritik der Politischen Oekonomie* (1859); *Lohnarbeit und Kapital* (English translation, *Wage Labor and Capital*); *Misère de la Philosophie* (1847); *The 18th Brumaire of Louis Bonaparte* (1852); *Life of Lord Palmerston* (1850); and *Revolution and Counter-Revolution.*

Marx was undoubtedly the founder of the modern socialistic school; in fact he first gave definite scientific statement to the principles of modern socialism. His greatest and best-known work, *Das Kapital,* is a monument of acute reasoning, extensive reading and knowledge, and skilful exposition. In this he analyzes carefully his theory of value, which is that the measure of the value of a commodity is the amount of labor 'socially necessary' to produce it, and shows how under the capitalistic system the laborers are exploited of what they produce over and above their wages (surplus value). See SOCIALISM. Consult: Aveling, *The Student's Marx;* Deville, *The People's Marx,* for epitomes of *Capital.*

MARY, The Blessed Virgin (Heb. *Miriam*, Gr. *Maria* or *Mariam*): called in the New Testament 'the mother of Jesus' (Matt. ii. 11; Acts i. 14). As the mother of the Lord Jesus according to the flesh, she is held in honor by all Christians: this honor has taken on such development in the Roman Church, and in the churches of the East—the Greek, Syrian, Coptic, Abyssinian, Arminian—that the intercession of the Virgin is invoked with a higher religious worship and a firmer confidence than that of all the other saints. Of this worship no hint is given in the New Testament; and its prominence in the church dates from the council of Ephesus, 431.—Of the Virgin's personal history, few particulars are recorded in Scripture. Some details are filled up from the works of the early Fathers, especially their commentaries or deductions from the scriptural narrative; some from the apocryphal writings of the first centuries, and some from mediæval or modern legendaries. The twofold genealogy of our Lord (Matt. i. 1–16; Luke iii. 23–38) contains the only statement regarding the family of M. which the sacred writers have left. From this it is known that the Virgin was of the same tribe with her husband Joseph—the tribe of Judah, and of the royal lineage of David (see Ps. cxxxii. 11; Luke i. 32; Rom. i. 3); that she had a sister, probably of the same name with herself, Mary (Jn. xix. 25); and that she was connected by marriage, with Elisabeth, who was of the tribe of Levi and lineage of Aaron. All beyond this concerning her antecedents and family, is tradition, and of little weight. The incidents in her personal history recorded in Scripture are few in number, and almost entirely refer to her relations with the Lord Jesus: see Matt. i.; ii.; xii.: Luke i.; ii.: John ii.; xix.: Acts i., where the last notice of her is of her 'continuing steadfastly in prayer' with the disciples and the holy women at Jerusalem after the Lord's ascension (Acts i. 14). Beyond these few facts, the Scripture is silent as to the life of M. during the presence of the Lord Jesus on earth; nor of her later life is there any record whatever in the canonical Scriptures. The apocryphal gospels, entitled 'The Gospel of the Nativity of Mary,' and the 'Protevangelion of the Birth of Christ,' contain some additional, but, of course, unauthentic and legendary particulars as to the lineage, birth, and early years of M.; among which is the miraculous story of her betrothal with Joseph, immortalized by the pencil of Raphael, according to which narrative Joseph was selected from among all who had been proposed as suitors for the hand of M. by the supernatural sign of a dove issuing from his rod and alighting upon his head (see the *Protevangelion*, cap. viii.). As to her history after the ascension of her Son, the traditions differ widely. A letter ascribed to the Council of Ephesus speaks of her as having lived with John at Ephesus, where she died, and was buried. Another epistle, nearly contemporaneous, tells that she died and was buried at Jerusalem, at the foot of the Mount of

THE VIRGIN MARY.

Olives. Connected with this tradition is the incident, so frequent a subject of sacred art, of the apostles coming to her tomb on the third day after her interment, and finding the tomb empty, but exhaling an 'exceeding sweet fragrance.' On this tradition is founded the belief of her having been assumed into heaven, which is celebrated in the festival of the Assumption. The date of her death is commonly fixed A.D. 63, or, according to another account, 48. Another tradition makes her survive the crucifixion only 11 years.

Many theological questions regarding the Virgin M. have been raised among Christians of the various churches. One of these has recently been prominent before the Christian world: see IMMACULATE CONCEPTION. The perpetual virginity of M. is not explicitly attested in Scripture, and there are even certain phrases which seem to imply that children were born of her after the birth of Jesus; e.g., where Jesus is called (Matt. i. 25; Luke ii. 7) her '*first*born son,' and where James and others are more than once called 'brothers of the Lord.' On the latter argument, no critic acquainted with the wide scriptural use of the word 'brother' would place positive reliance. The former argument, urged anciently by Helvidius and others, has never had wide acceptance, and is not a settlement of the question. The perpetual virginity of M. is held as a firm article of belief in the Roman and Eastern churches. Protestants hold nothing positively on the subject, refusing to accept the perpetual virginity as a fact for lack of historical proof, and perhaps tending usually to favor the negative. The controversies regarding the Virgin M. have reference to the lawfulness of the worship which is rendered to her in some Christian communities: see MARIOLATRY.

MARY I., Queen of England: 1516, Feb. 18—1558, Nov. 17 (reigned 1553–58); b. Greenwich; daughter of Henry VIII. by his first wife, Catharine of Aragon. She was in her early years a favorite with her father, who had her carefully educated after the masculine fashion of her time. Erasmus praises particularly the style of her Latin letters. At the age of seven, she was betrothed to Emperor Charles V. of Spain; but when Henry sought a divorce from Queen Catharine, the Spanish monarch broke off the engagement. Her father then tried to marry her to Francis I. of France, but his design did not succeed. Francis, however, asked her for his second son, the Duke of Orleans, but Henry in turn refused. After the birth of Elizabeth, Henry's affections were diverted to that princess; and when James V. of Scotland sought the hand of M., it was refused, on the ground that the issue of such union might imperil the right of Anne Boleyn's children to the crown. This was virtually condemning M. to celibacy, and doubtless had the effect of making her still more attached to the Rom. Cath. party, to which, on account of her training, her natural tendencies, and the wrongs of her mother, she was already closely allied. Several other matrimonial negotiations, with the Prince of Portugal, the Duke of

Cleves, and the Duke of Bavaria, also came to nothing. About this time, she was in great danger of losing her life, on account of her strong attachment to her mother's interests and maintenance of her rights. The unfortunate princess had a wretched childhood, repeatedly offered and withdrawn in the matrimonial market, compelled by a brutal father to acknowledge the illegitimacy of her birth, and forbidden to see her mother—even for farewell at her death. Toward the close of Henry's reign, better prospects opened for her. She was induced to make a humble submission to her father, in terms which were abhorrent but which made her life tolerable; and in 1544, she was restored to her place in the line of succession, of which she had been deprived; and she lived on very good terms with Catharine Parr, the last of her father's numerous wives. During the reign of her half-brother, Edward VI., she lived in retirement, but had three more offers of marriage—from the Duke of Brunswick, the Markgraf of Brandenburg, and the Infante of Portugal—none of which was accepted. On the death of Edward, 1553, she was proclaimed queen; and after a brief and imbecile struggle on the part of those who advocated the claims of Lady Jane Grey, was crowned in Oct. of the same year by Stephen Gardiner, Bp. of Winchester. A fierce spirit in favor of the papacy soon began to show itself, though it does not appear that M. herself was at first disposed to be severe; she even occasionally interfered to mitigate the cruelties of Gardiner and Bonner; but after her marriage with Philip of Spain, 1554, July 25, to whose father she had been betrothed many years before, a worse spirit took possession of her, or at least worse counsels prevailed; and those bloody persecutions of the Protestants began which have given her an odious name in history. Nearly 300 victims perished by burning—among them many of the best of England's good men—such as Rogers, Hooper, Ridley, Latimer, Cranmer. Her domestic life was wretched; Philip, whom she loved with a morbid passion, proved a sour, selfish, and heartless husband. She had no children; and exasperation and loneliness working upon a temper naturally obstinate and sullen, doubtless rendered her more compliant to the sanguinary policy of the reactionary bishops. Fortunately for England, her reign was brief. She died after much suffering from dropsy and nervous debility. Her death was pitiable, both as the friendless ending of a life that had been clouded from its beginning, and as being hailed by the nation as a deliverance. She has been made the subject of a tragedy by Lord Tennyson.

MARY (MARY STUART), Queen of Scots: 1542, Dec. 8—1587, Feb. 8 (crowned 1543; reigned 1561–67; Queen of France 1559–60): b. Linlithgow, Scotland: beautiful and accomplished, but most unhappy princess, daughter of King James V. of Scotland by his second wife, Mary of Lorraine, who was daughter of Claude, Duke of Guise.

and widow of Louis of Orleans, Duke of Longueville. Her misfortunes may be said to have begun with her birth. Its tidings reached her father on his deathbed at Falkland, but brought him no consolation. 'The devil go with it!' he muttered, as his thoughts wandered back to the marriage with Bruce's daughter, which brought the crown of Scotland to the Stuarts—'it came from a woman, and it will end in a woman!' Mary became a queen before she was a week old. Before she was a twelvemonth old, the Regent Arran had promised her in marriage to Prince Edward of England, and the Scottish parliament had declared the promise null. War with England followed, and at Pinkie Cleuch the Scots met a defeat only less disastrous than Flodden. But their aversion to an English match was unconquerable; they hastened to place the young queen beyond the reach of English arms, on the island of Inchmahome, in the Lake of Monteith, and to offer her in marriage to the eldest son of Henry II. of France and Catharine de' Medici. The offer was accepted; and 1548, July, a French fleet carried Mary from Dumbarton, on the Clyde, to Roscoff, in Brittany, whence she was at once conveyed to St. Germain-en-laye, and there affianced to the Dauphin.

Her next ten years were passed at the French court, where she was carefully educated with the king's family, receiving instructions in the art of making verses from the famous Ronsard. At a somewhat later period, she had the great Scottish scholar Buchanan for her Latin master. 1558, April 24, her marriage with the Dauphin, who was about two years younger than herself, was celebrated with every circumstance of pomp and splendor in the Church of Notre-Dame at Paris. It was agreed on the part of Scotland, that her husband should have the title of King of Scots; but this was not enough for the grasping ambition of France: and Mary was betrayed into the signature of a secret deed, by which, if she died childless, both her Scottish realm and her right of succession to the English crown (she was great-granddaughter of King Henry VII.) were conveyed to France. 1559, July 10, the death of the French king called her husband to the throne as Francis II. The government passed into the hands of the queen's kinsfolks, the Duke of Guise and the Cardinal of Lorraine: but their rule was short-lived. The feeble and sickly king died 1560, Dec. 5, when the reins of power were grasped by the queen-mother, Catharine de' Medici, as regent for her son, Charles IX. Mary must have been prepared, under almost any circumstances, to quit a court swayed by one whom, during her brief reign, she had taunted with being 'a merchant's daughter.' But there were other reasons for her departure from France. Her presence was urgently needed in Scotland, which the death of her mother a few months before had left without a government, at a moment when it was convulsed by the throes of the Reformation. Her kinsmen of Lorraine had ambitious projects for her marriage; great schemes were based on her nearness of

succession to the English crown; and both these, it was thought, might be more successfully followed out when she was seated on her native throne.

She sailed from Calais 1561, Aug. 15, and arrived at Leith, Aug. 19, having escaped the English ships-of-war which Elizabeth dispatched to intercept her. She wept as the shores of France faded from her sight, and her tears flowed anew when she beheld the rudeness and poverty of Scotland. Her government began auspiciously. The Reformation claimed to have received the sanction of the Scottish parliament, and if Mary did not formally acknowledge the claim, she was at least content to leave affairs as she found them, stipulating only for liberty to use her own religion—a liberty which Knox with a few extreme Reformers denounced as a sin against the law of God. She is said to have rejected the violent counsels of the Rom. Catholics; it is certain that she surrounded herself with Prot. advisers, her chief minister being her illegitimate brother, James Stuart, an able if ambitious statesman, whom she soon afterward created Earl of Murray. Under his guidance, in the autumn of 1562, she made a progress to the north, which, whatever its design, ended in the defeat and death of the Earl of Hunt[illegible], powerful chief of the Rom. Cath. party in Scotland.

Meanwhile, the courts of Europe were busy with schemes for Mary's marriage. The king of Sweden, the king of Denmark, the king of France, the Archduke Charles of Austria, Don Carlos of Spain, the Duke of Ferrara, the Duke of Nemours, the Duke of Anjou, the Scottish Earl of Arran, and the English Earl of Leicester were proposed as candidates for her hand. Her own preference was for Don Carlos, heir of what was then the greatest monarchy in Christendom; and it was not until all hopes of obtaining him were quenched, that she thought seriously of any other. Her choice fell, at first sight, on her cousin, Henry Stuart, Lord Darnley, son of the Earl of Lennox, by his marriage with a granddaughter of King Henry VII. of England. He was thus among the nearest heirs to the English crown, and his claims to the succession were believed to have the support of the great body of English Rom. Catholics. But except this, and his good-looks, he had no recommendation. He was weak, needy, insolent, vicious; his religion, such as it was, was Rom. Catholic; his house had few friends and many enemies in Scotland; and he was two or three years younger than Mary. Her best friends, both Rom. Cath. and Prot., warned her against him in vain. The marriage was celebrated at Holyrood, 1565, July 29. It was a signal for an insurrection by Murray and the Hamiltons, who hoped to be joined by the whole Prot. party. But their hope was disappointed; and the queen, taking the field in person in Oct. with 18,000 men, at once quelled the revolt, and chased the rebels beyond the Tweed.

Her triumph was scarcely over, when her eyes began to open to the great mistake of her marriage. Her hus-

band's worthlessness and folly became apparent; she was disgusted by his debauchery, and alarmed by his arrogance and ambition. At his demand she had illegally given him the title of king, but he demanded further that the crown should be secured to him for life, and that if the queen died without issue, it should descend to his heirs. Mary hesitated to comply with a demand which would have set aside the settled order of succession; and what she refused to grant by favor, the king prepared to extort by force.

Mary's chief minister, since Murray's rebellion, had been David Riccio, a mean-looking Italian, of great ability and many accomplishments; but generally hated beyond the palace walls as a base-born foreigner, a court favorite, and a Rom. Catholic. The king and Riccio had been sworn friends, sharing the same table, even sleeping in the same bed; but the king was now persuaded that it was Riccio who was the real obstacle to his designs upon the crown. In this belief, he entered into a formal compact with Murray, Ruthven, Morton, and other chiefs of the Prot. party, undertaking on his part to prevent their attainder, or procure their pardon, and to support and advance the Prot. religion; while they, on the other part, bound themselves to procure the settlement of the crown on him and his heirs, and to take and slay, if need were, even in the queen's palace and presence, every one who opposed it. The result of this conspiracy was the murder of Riccio, 1566, Mar. 9, the king leading the way into the queen's cabinet, and holding her in his grasp, while the murderers dragged the poor Italian into an ante-chamber, and mangling his body with more than 50 wounds, completed what they believed, and Knox pronounced to be, 'a just act, and most worthy of all praise.' When Mary learned what had been done, she broke out in reproaches against the king, as to blame for all. 'I shall be your wife no longer,' she told him, 'and shall never like well till I cause you have as sorrowful a heart as I have at this present.' As had been agreed beforehand among the conspirators, Mary was kept prisoner in Holyrood; while the king, of his own authority, dismissed the parliament which was about to forfeit Murray and his associates in the late insurrection. The plot was thus far successful; but Mary no sooner perceived its objects, than she set herself at work to defeat them. Dissembling her indignation at her husband's treachery and the savage outrage in which he had been leader, she succeeded by her blandishments in detaching him from the conspirators, and in persuading him not only to escape with her from their power by a midnight flight to Dunbar, but to issue a proclamation in which he denied all complicity in their designs. The conspiracy thus came to an end; Ruthven and Morton fled to England, while Murray, by renouncing their cause, hastened to make his peace with the queen; and the king, hated by both sides, because he had betrayed

both sides, became an object of mingled abhorrence and contempt.

It was an aggravation of the murder of Riccio that it was committed, if not in the queen's presence, at least within a few yards of her person, only three months before she gave birth (1566, June 19) to the prince who became King James VI. As that event drew near, the queen's affection for her husband seemed to revive; but the change was only momentary; and before the boy's baptism, in Dec., her estrangement from the king was greater than ever. Divorce was openly discussed in her presence, and darker designs were not obscurely hinted at among her friends. The king, on his part, spoke of leaving the country; but before his preparations were completed, he fell ill of a disease, said by some to have been small-pox, but suspected by others to have been the result of poison, and was removed to Glasgow and left with his father, 1567, about Jan. 9. Jan. 25, Mary went to see him, and, travelling by easy stages, brought him to Edinburgh on the 31st. He was lodged in a small mansion beside the Kirk of the Field, nearly on the spot where the s.e. corner of the University now stands. There Mary visited him daily, and slept for two nights in a room below his bedchamber. She passed the evening of Sunday, Feb. 9, by his bedside, talking cheerfully and affectionately with him, though she is said to have dropped one remark which gave him uneasy forebodings —that it was much about that time twelvemonth that Riccio was murdered. She left him between 10 and 11 o'clock to take part in a masque at Holyrood, at the marriage of a favorite valet. The festivities had not long ceased in the palace, when, about two hours after midnight, the house in which the king slept was blown up by gunpowder; and the bodies of Darnley and a page were found strangled in a neighboring garden, to which apparently they had escaped, and where Bothwell's confederates had overtaken and murdered them.

The chief actor in this tragedy was undoubtedly James Hepburn, Earl Bothwell, a needy, reckless, vainglorious, profligate noble, who, since Murray's revolt, and still more since Riccio's murder, had received a large share of the queen's favor. But there were suspicions that the queen herself was not wholly ignorant of the plot, and these suspicions could not but be strengthened by what followed. Apr. 12, Bothwell was brought to a mock-trial, during which, as he held the castle, and had 4,000 armed men in the streets near by, the proclaimed prosecutor Lennox did not appear: thus he was acquitted by default. On the 24th, he intercepted the queen on her way from Linlithgow to Edinburgh, and carried her, with scarcely a show of resistance, to Dunbar. May 7, he was divorced from a young and comely wife whom he had married little more than a twelvemonth before; on the 12th, Mary publicly pardoned his seizure of her person, and created him Duke of Orkney; and on the 15th—only three months after her husband's murder

—she married the man whom every one regarded as his murderer. This conscientious murderer, being a Prottestant, refused to be married according to the rites of the queen's church; so she consented to the performance of the ceremony by a convert from the Roman to the Prot. faith.

This fatal marriage at once arrayed her nobles in arms against her. She was able to lead an army against them, but it melted away without striking a blow on the field of Carberry (June 15), when nothing was left to her but to abandon Bothwell, and surrender herself to the Confederated Lords. She took passionate leave of Bothwell; and while from the ranks of those into whose power she had fallen, loud cries were rising for her death as a harlot and a murderess, she declared her purpose to have every man of them hanged and crucified, and as she rode away a captive, beside Lord Lindsay, swore to him that she would have his head for this. The lords led her to Edinburgh, where the insults of the rabble and her grief at parting with Bothwell threw her into such a frenzy, that she refused all nourishment, and rushing to the window of her room in the provost's house to which she had been taken as a refuge from the fury of the mob, called for help, and showed herself to the people with dress disordered and with her hair hanging about her ears.

From Edinburgh, she was hurried to Loch Leven, where, July 24, she was prevailed on to sign an act of abdication in favor of her son, who, five days afterward, was crowned at Stirling. Escaping from her island-prison, 1568, May 2, she found herself in a few days at the head of an army of 6,000 men. On the 12th, it was met and defeated by the regent Murray at Langside, near Glasgow. Four days afterward, in spite of the entreaties of her best friends, Mary crossed the Solway, and threw herself on the protection of Queen Elizabeth, only to find herself a prisoner for life. From Carlisle, her first place of captivity, she was taken, in July, to Bolton; thence, 1569, Feb., to Tutbury; from Tutbury, she passed in succession to Wingfield, to Coventry, to Chatsworth, to Sheffield, to Buxton, and to Chartley. At several periods in her long captivity, facts came to the surface which were held to imply that she was made, either with, or without her will or knowledge, the pivot on which turned a plot for the Spanish invasion of Britain with a view to its subjugation to the Rom. Catholic dominion. She was removed, last of all, to Fotheringhay, 1586, Sep., there to be tried on a charge of complicity in a plot against the life of Elizabeth. Sentence of death was pronounced against her Oct. 25; but it was not until 1587, Feb. 1, that Elizabeth took courage to sign the warrant of execution. It had largely become the public feeling in England, that the throne and liberty of the realm were not secure while this brilliant, fearless, resolute, fascinating, ambitious, unscrupulous, dethroned queen, unfriendly to the Prot. succes-

sion, remained. The sentence was carried into effect on the 8th, when Mary laid her head upon the block with the dignity of a queen and the constancy and resignation of a martyr. Five months afterward, her body was buried with great pomp at Peterborough, whence, 1612, it was removed to King Henry VII.'s Chapel at Westminster, where it still lies in a sumptuous tomb erected by King James VI.

'The character of Mary was long one of the most fiercely vexed questions of history, and is still in debate, though the great preponderance of authority is now on the side of those who believe in her criminal love for Bothwell and her guilty knowledge of his conspiracy against her husband's life. She possessed dauntless courage, high ambition, indomitable will, a nature fiercely passionate yet capable of the most winning sweetness, great capacity for intrigue, though naturally inclined rather to open, direct, and heroic methods. Her beauty and accomplishments have never been disputed. 'She was confessed by every one,'—says Joseph Robertson, one of the latest writers on her life—'to be the most charming princess of her time. Her large sharp features might perhaps have been thought handsome rather than beautiful, but for the winning vivacity and high joyous spirit which beamed through them. It has been questioned whether her eyes were hazel or dark gray, but there is no question as to their star-like brightness. Her complexion, although fresh and clear, would seem to have been without the brilliance so common among our island beauties. Her hair appears to have changed with her years from a ruddy yellow to auburn, and from auburn to dark brown or black, turning gray long before its time. Her bust was full and finely shaped, and she carried her large, stately figure with majesty and grace. She showed to advantage on horseback, and still more in the dance. The charm of her soft, sweet voice is described as irresistible; and she sang well, accompanying herself on the harp, the virginals, and still oftener on the lute, which set off the beauty of her long, delicate, white hand. The consciousness how that hand was admired may have made it more diligent in knitting and in embroidery, in both of which she excelled. Her manner was sprightly, affable, kindly, frank perhaps to excess, if judged by the somewhat austere rule already beginning to prevail among her Scottish subjects. She spoke three or four languages, was well and variously informed, talked admirably, and wrote both in prose and in verse, always with ease, and sometimes with grace, or vigor.'

Mary's prose-writings have been collected by the enthusiastic devotion of Prince Alexander Labanoff, in *Recueil des Lettres de Marie Stuart.* Setting aside the 12 sonnets which she is said to have written to Bothwell, and which survive only in a French version of an English translation, no more than six pieces of her poetry, containing in all less than 300 lines, are now known. They have no remarkable merit. The best is the poem

of eleven stanzas on the death of her first husband, Francis II., printed by Brantôme. The longest is a *Meditation* of a hundred lines, written 1572, and published two years afterward by her ever-faithful follower, Bp. Lesley of Ross. All are in French, except one sonnet in Italian. The sweetly simple lines beginning, 'Adieu, plaisant pays de France,' so often ascribed to her, are the work of A. G. Meusnier de Querlon, French journalist, who died 1780. A volume of French verse on the *Institution of a Prince*, which she wrote for the use of her son, has been lost since 1627, with a Latin speech in vindication of learned women, which, when no more than 13 years of age, she delivered in the hall of the Louvre, in presence of the French court.

To enumerate all that has been written on Mary would fill a volume. Among the chief works are S. Jebb's *De Vita et Rebus Gestis Mariæ Scotorum Reginæ* (Lond. 1725, 2 vols. fol.); J. Anderson's *Collections Relating to the History of Mary, Queen of Scotland* (Lond. 1727–8, 4 vols. 4to); Bp. Keith's *History of the Affairs of Church and State in Scotland* (Edin. 1734, fol.; 1844–50, 3 vols. 8vo); W. Goodall's *Examination of the Letters said to be written by Mary, Queen of Scots, to James, Earl of Bothwell* (Edin. 1754, 2 vols. 8vo); Principal Robertson's *History of Scotland;* W. Tytler's *Inquiry into the Evidence against Mary, Queen of Scots* (Edin. 1759, 8vo; Lond. 1790, 2 vols. 8vo); M. Laing's *History of Scotland;* G. Chalmers's *Life of Mary, Queen of Scots* (1818, 2 vols.; 1822, 3 vols.); P. F. Tytler's *History of Scotland;* Prince Labanoff's *Recueil des Lettres de Marie Stuart* (1844); David Laing's edition of *John Knox's History of the Reformation* (1846–48); Agnes Strickland's *Lives of the Queens of Scotland* (Edin. 1850–59, 8 vols. 8vo); A. de Montaiglon's *Latin Themes of Mary Stuart* (Lond. 1855, 8vo); Prince Labanoff's *Notice sur la Collection des Portraits de Marie Stuart* (1856); M. Mignet's *Histoire de Marie Stuart* (1852); M. Teulet's *Lettres de Marie Stuart* (1859); M. Cheruel's *Marie Stuart et Catherine de Medicis* (1858); Robertson's *Catalogues of the Jewels, Dresses, Furniture, Books, and Paintings of Mary, Queen of Scots* (1863); Hosack's *Mary, Queen of Scots, and her Accusers* (1870–74); histories by Petit and De Flandre (1874), Chantelauze (1876), Leader (1880), and the interesting document by Claude Nau, her secretary (ed. by Father Stevenson, 1883).

The best representations of Mary are the contemporary portraits by the French painter, Francis Clouet, usually called Jehannet or Janet; and the statue, by an unknown sculptor, on her tomb at Westminster. All portraits which cannot be reconciled with these types may be rejected as spurious.

MARY (ST.) AND ALL SAINTS, LINCOLN, commonly called LINCOLN COLLEGE, Oxford: see LINCOLN COLLEGE.

MARY-BUD, n. *mā′rĭ-bŭd*, or MARY-GOLD: the marigold, which see.

MARY HALL (ST.), Oxford: see ST. MARY HALL.

MARYLAND, *mā′rĭ-lănd* or *mĕr′ĭ-land:* a state, one of the original 13 states in the American Union; 10th in coal, 10th in tobacco, 8th in pig iron; 16th in iron ore, 14th in value of manufactures, 26th in population, 3d in value of domestic exports; named in honor of Maria, wife of King Charles II. of England.

Location and Area.—M. is in lat. 37° 53′—39° 44′ n., long. 75° 2′—79° 30′ w.; bounded n. by Penn., e. by Del. and the Atlantic Ocean, s., s.w., and w. by Va. and W. Va., n.w. by W. Va.; extreme length e. to w. 198 m., breadth 3–120 m.; 12,210 sq. m. (7,814,400 acres); coast line 509 m.; cap. Annapolis.

Topography.—M. is naturally divided into 3 districts: the East Shore peninsula, between Chesapeake and Delaware Bays and the Atlantic Ocean; the West Shore peninsula, between Chesapeake Bay and the Potomac river; and the n. and w. region, which is traversed by the Blue Ridge and Alleghany Mountains. Both peninsulas are alluvial; the east shore being in places low and swampy, and broken and rocky; and the west shore level, sandy, and marshy, with rising terraced surface reaching the mountainous region. The central and n.w. regions are covered with rich loams and agricultural clays, a part resting on limestone strata. The coast line comprises 33 m. on the Atlantic, nearly 400 m. on Chesapeake Bay, and the remainder of the 509 m. on the adjacent islands. There are no harbors of consequence on the Atlantic, but Chesapeake Bay—navigable its entire length—has several excellent ones. The state is well watered. The Potomac is the principal river, flows 450 m., and is navigable 200 m. The Wicomico, Patuxent, South, Severn, Patapsco, Bush, and Susquehanna on the West Shore; the Pocomoke, Manokin, Nanticoke, Choptank, St. Michael's, Wye, Chester, Elk, and Sassafras on the East Shore; and Fishing, Honga, and Hudson. Beside Chesapeake Bay, which has Pocomoke and Tangier Sounds and Eastern Bay, there are Chincoteague, Sinepuxent, and St. Martin's bays. The chief islands are Kent, Bloodworth's, Holland's, Smith's, Tangier, Halfmoon, and Assateague.

Climate.—The climate is temperate, and, excepting in the lowlands on Chesapeake Bay, salubrious. The mean annual temperature of the central portion of the state is 56°, n. portion 54°, w. highlands 50° F. There are no extremes of heat and cold. Temperature at Baltimore 33°—41° winter average, 73°—79° summer average; average rainfall 41 inches; greatest annual rainfall (w. shore of Chesapeake Bay) 50 inches.

Geology.—The formations from the alluvial deposits in the Chesapeake Bay region are: Pleistocene in St. Mary's co.; clays, sands, and calcareous marls of the Miocene on the East Shore; Tertiary ferruginous sands and clays on the West Shore, with deposits of argillaceous carbonate of iron from Washington to the head of the bay; cretaceous in the n.e. portion; metamorphic rocks, talcose, mica slate, and limestone running n.e. and s.w. back of

MARYLAND	DELAWARE
Area in Square Miles 12,219	Area in Square Miles, 2,050
Population, 1,188,044	Population, 184,735
Number of Counties, 24	Number of Counties, 3
Capital of State, Annapolis	Capital of State, Dover

Baltimore; middle secondary red sandstone passing through Carroll and Frederick cos.; Silurian rocks and Potsdam sandstone on the w. line of Frederick co.; and calcareous strata in the e. portion of Washington co. In mineralogy, marls, magnesia, honestone, and traces of gold, nickel, and cobalt have been found. The n.w. cos. contain inexhaustible veins of bituminous and semi-bituminous coal; the 'Bare Hills' in the metamorphic rocks back of Baltimore have valuable beds of chrome iron; the same group of rocks also yields silicates and hydrates of magnesia, copper, and excellent limestones and marble; at Sykesville specular iron ore abounds. The middle secondary red sandstone region contains the beautiful brecciated marble from which the pillars in the old house of representatives in the national capitol were made. Frederic co. has several copper mines; and the e. region contains much bog-iron ore. The total value of the mineral product of Maryland averages (including coal, iron, clay, and building stones) over $9,000,000. Coal heads the list with a value of $5,000,000; brick and tile follow with a value of $1,100,000. The soil in the e. is particularly adapted to the cultivation of the peach and market-garden products; in the central valleys and n. cos. to tobacco, wheat, and Indian corn. The lowland regions contain gum, cypress, cedar, juniper, dogwood, magnolia, holly, elm, cherry, beech, sycamore, sassafras, and persimmon; the mountainous, oak, maple, walnut, ash, birch, hickory, chestnut, pine, and spruce.

Zoology.—M. contains few wild animals, and these are limited to bears, deer, foxes, raccoons, and opossums; but small game is still abundant; wild-ducks, brant, teal, pigeons, partridges, quail, and snipe abound in the bays, estuaries, and on the East Shore. The beautiful Baltimore oriole, the rice-bird, known in the north as the bobolink, and varieties of the finch and tanager, are the best known birds. Fish are varied, abundant, and choice in quality; and M. oysters are appreciated the world over.

Agriculture.—There are about 50,000 farms in M., comprising about 5,250,000 acres, of which about three-fifths is improved land. The total value of all farm property, including lands, buildings, and improvements, implements and machinery, and live stock, is nearly $225,000,000. The principal crops are corn, wheat, oats, barley, rye, buckwheat, potatoes, hay, and tobacco.

Manufactures.—There are about 4,000 manufacturing establishments in the State, the aggregate annual production of which is valued at more than $250,000,000. The manufacturing plants are established for the most part in Baltimore and its vicinity, and in the cities of Cumberland, Hagerstown, and Frederick, and the small towns in the central and s. part of the State. In manufacturing industries Baltimore ranks among the first ten

cities in the United States. The chief industries are men's clothing, canning and preserving, iron and steel products, foundry and machine-shop products, flour and grist-mill products, tinware and copper-smithing, etc., fertilizers, and slaughtering and meat packing. M. is also among the foremost States in shipbuilding, there being large plants engaged in iron and steel shipbuilding in Baltimore and vicinity.

Commerce and Transportation.—The annual imports at Baltimore aggregate about $25,000,000, and the exports nearly $100,000,000. The principal articles of export are oysters, tobacco, petroleum, grain, sugar, cotton, cattle, and flour. Over 15 steamship and steamboat lines connect Baltimore with domestic and foreign ports. There are about 35 lines of railway, either entering or passing through Baltimore, or, directly or indirectly, in connection with other lines. The principal roads are the Pennsylvania and the Baltimore & Ohio. Altogether the State has a total trackage of about 1,500 miles. There are also about 10 lines of street railway, operating approximately 500 miles.

Finance and Banking.—The total assessed valuation of property, including both personal and realty, is $820,831,339, the tax rate is $1.60 per $1,000, and the net debt $679,976. There are nearly 100 national banks, over 30 State banks, about 20 savings banks, and about 10 loan and trust companies. Baltimore also does an extensive clearing-house business.

Education.—M. spends nearly $3,500,000 in the maintenance of its public schools, in which about 250,000 pupils are enrolled, with nearly 5,500 teachers. There are both public and private normal schools, many private secondary schools, co-educational colleges and universities, colleges and universities for men only, colleges and seminaries for women, and schools of technology, law, theology, and medicine. Of the institutions for higher education Johns Hopkins is one of the most noted in the country, while the United States Naval Academy is at Annapolis.

Religion.—The strongest denominations in the State are the Roman Catholic, Methodist Episcopal, Protestant Episcopal, Lutheran, African Methodist, Methodist Protestant, Reformed, Methodist Episcopal, South; Presbyterian, North; and Regular Baptist, South, though other sects are represented.

History.—Capt. William Claiborne with a party from Va., made the first white settlement in M., locating on Kent Island in Chesapeake Bay 1631. The first permanent settlement was made at St. Mary's, by Leonard Calvert, as gov., and 200 emigrants 1634, under a charter granted to Cecil Calvert, second Lord Baltimore, 1632. After this settlement the Claiborne colonists, refusing to recognize the Calvert charter, were expelled. The Calvert colony was founded on the proclaimed basis of

religious toleration, though its promoters and early members were Rom. Cath. in faith, and was largely sought by victims of religious persecution elsewhere. The first assembly organized under the charter met 1635; a dispute as to whether the assembly or the lord proprietor had the right to take the initiative in public legislation was settled by Lord Baltimore conceding the right to the assembly 1638; and the first serious trouble occurred 1642-47, when the authority of the proprietor was resisted by a party of Va. Puritans who had settled in M., and by the Claiborne party, who had regained Kent's Island. In 1645 these parties joined forces and compelled Gov. Calvert to flee into Va.; but 1647 he returned at the head of a milit. force and recovered possession. In 1649 the assembly passed an act allowing Christians of all sects to worship God according to the dictates of their own consciences, and in the following year the Puritans began a movement designed to wrest the colony from its proprietor, though Gov. Calvert industriously sought to reconcile them, granted them large tracts of land, and organized their chief settlements into separate cos., Anne Arundel and Charles, the Puritans continued turbulent, and by the time of the establishment of the Commonwealth in England, had a majority of the population in the colony. The Puritans then insisted on an immediate transfer of the colonial govt. to them, to which the Calverts objected; and, pending the dispute, commissioners from England visited M. 1652, associated with them in council Capt. Claiborne and Bennett, the leader of the Puritans, and established the authority of the Commonwealth. Lord Baltimore's attempt 1654 to recover possession of the province, led to a civil war in which the entire proprietary force was killed or captured 1655, Mar. 25. In 1658, on the Restoration, Lord Baltimore recovered his proprietary rights, and the colony began to thrive. In 1688, King William assumed the govt. of the province, and the cap. was removed from St. Mary's to Providence, thereafter known as Annapolis. In 1715, Charles, the first Prot. Calvert, succeeded to the proprietary rights, and for the first time in 24 years the authority of the proprietary was recognized through the province, though John Hart, the last royal gov., was continued in office till 1720.

From this time the progress of M. was rapid. Baltimore was laid out 1730; the *Maryland Gazette* was established and Frederic laid out 1745; the Mason and Dixon boundary line (q.v.) between Penn. and M. was run 1750; and Georgetown was laid out 1751. During 1754-58 the w. portion of M. was imperiled by the Indians. The people bore an active part in the two French wars; opposed the stamp act and tea duty act; and 1774, Dec., took the control of public affairs into their own hands in a popular convention, and thus closed the history of the proprietary govt. A bill of rights and a constitution were adopted 1776, Nov.; the first legis-

lature assembled at Annapolis 1777, Feb. 5; and Thomas Johnson was elected the first republican gov. Feb. 13, following. The 'Maryland Line' was an efficient body of soldiers in the revolutionary army. The federal congress met at Annapolis 1783: Washington resigned his commission to it Dec. 23, and the federal constitution was adopted 1788, Apr. 28. During the second war with England, several M. towns were plundered and burned by the British under Admiral Cockburn; the M. militia vainly attempted to check the march of the British to Washington: and 1814, Sep., the Americans defeated the British at North Point and successfully defended Fort McHenry, the chief defense of Baltimore, against the bombardment of the British fleet. The first blood of the civil war was shed in Baltimore 1861, Apr. 19. The state was several times traversed by Confederate armies, and important engagements were fought at Antietam, South Mountain, and Monocacy. The state was kept in the Union, notwithstanding it had many sympathizers with the Confederacy, and it contributed 49,730 men to the federal armies. The chief event in late years was the fire in 1904 which nearly destroyed Baltimore (q.v.).

Government.—The executive authority is vested by the constitution in a gov., elected for 4 years; the legislative in a general assembly, comprising a senate of 27 members elected for 4 years, and a house of delegates of 101 for 2 years; and the judicial in a court of appeals, circuit, orphans' superior, common pleas, city, and criminal courts, and justices of the peace. The court of appeals consists of 8 judges, one from each judicial district, elected by the people; the gov. appoints one of the number to be chief justice. Each district also has a circuit court consisting of a chief and two assoc. judges: the judge of the court of appeals in the district is *ex-officio* chief judge of the circuit court there, excepting in Baltimore; judges are elected for 15 years. The city of Baltimore constitutes a judicial district, and has 6 courts with judges elected for 15 years, viz., the Supreme Bench of Baltimore City, superior, circuit, common pleas, city, and criminal. Each co. and the city of Baltimore has an orphans' court of 3 judges elected for 4 years. All justices of the peace are appointed by the gov. The secretary of state is appointed by the gov. with the consent of the Senate and holds office during the governor's turn; the other officers are appointed by the gov. and hold office during his pleasure.

The successive govs. with their terms of service are as follows: *Lords Proprietary:* Cecil Calvert (2d Lord Baltimore) 1632-75; Charles Calvert (3d Lord B.) 1675-1715; Benedict L. Calvert (4th Lord B.) 1715; Charles Calvert (5th Lord B.) 1715-51; Frederick Calvert (6th Lord B.) 1751-71; Sir H. Harford (last proprietor) 1771-76; *Govs. of Lords Proprietary:* Leonard Calvert 1633-47; Thomas Green 1647-49; William Stone 1649-

ties—when void the relationship is unlawful from the beginning; when voidable it is lawful until the M. is dissolved by the decree of a competent tribunal.

The M. acts in many of the states render certain solemnities indispensable in the M. celebration, though informal marriages have to a large extent been recognized in the United States. A present agreement between competent parties to take each other for husband and wife is generally regarded as constituting a valid M. Such a M., in a contest, becomes the subject of proof, and may be proved by actual cohabitation as husband and wife, acknowledgment, declarations, conduct, repute, reception among neighbors, and the like. But the words of the agreement must not be *verba de futuro;* such an agreement only gives a cause of action for breach of promise to marry. If an agreement in *verba de futuro* is followed by a consummation, a legal presumption is raised that words *de præsenti* afterwar l passed between the parties, and, unless this presumption is rebutted, the M. may be sustained.

The formal M. throughout all of the states consists in having the celebration take place before a clergyman or before some civil officer designated by statute. So far as forms and ceremonies are concerned, it is a general rule that the validity of the M. is to be determined by the law of the state in which it is solemnized.

In the United States, jurisdiction in all matrimonial causes is usually vested in courts of equity, or courts of equitable powers.

Within recent years the rules of the common law as to property rights of husband and wife have been largely changed by statutes. These statutes, familiarly known as 'the married women acts,' have been adopted to a greater or less extent in all of the states. By these acts married women have been empowered to hold real and personal property, with the same right and management, control, and disposition as unmarried women would have, to carry on business on their own account, for their own exclusive benefit, and to make contracts in relation to their separate property and the conduct of their business, which will be enforceable at law. And in most of the states married women may sue and be sued in their own name, without joining the husband; although in some states it is still necessary to join the husband in suing the wife in certain cases of tort.

During the cohabitation the law will, from that circumstance, presume the assent of the husband to all contracts made by the wife for necessaries which are suitable to the husband's degree and estate. Even though the husband be an infant, he is liable for necessaries furnished to his wife and children, their interests being considered as identified with his.

Contracts in restraint of M. are wholly void; e.g., a promise to a woman to marry no one but her.

See HUSBAND AND WIFE. JUDICIAL SEPARATION: DIVORCE: also MIXED MARRIAGES: MIXED RACES.

MARROT, n. *măr′ŏt:* a large aquatic bird; the auk.

MARROW, n. *măr′rō* [Icel. *mergr;* Dan. *marg;* Dut. *margh;* Ger. *mark*, marrow, pith: Icel. *mor*, lard; *meria*, to bruise]: the soft, fatty matter contained in the cavities of bones (see below): the pith of certain plants; the essence; the best part. MAR′ROWISH, a. *-ĭsh*, having the nature of marrow. MAR′ROWY, a. *-rō-ĭ*, full of marrow: MAR′ROWLESS, a. *-lĕs*, without marrow. MAR′ROW-BONES, bones boiled for their marrow; the knee or leg bones: MAR′ROW-FAT, a choice but late variety of pea. VEGETABLE MARROW, the fruit of the *Cucur′bĭtă ovĭf′ĕra*, a supposed variety of the common gourd, ord. *Cucurbĭtācĕæ*—so named from the softness of its fleshy substance; also called *egg-gourd.*

MARROW, n. *măr′rō* [Gael. *mar*, like; *maraon*, together]: in *Scot.* and *prov. Eng.*, a mate; a companion; one of a pair: V. to pair; to match: ADJ. similar; suitable. MAR′ROWING, imp. MARROWED, pp. *măr′rōd.* MAR′ROWLESS, a. *-lĕs*, without another to match.

MAR′ROW: substance of low specific gravity, filling the cells and cavities of the bones of mammals. There are two varieties, *watery marrow* and *oily marrow.* In some of the short bones, as the bodies of the vertebræ and the sternum, the marrow has a reddish color, and is found on analysis to contain 75 per cent. of water, the remainder consisting of albuminous and fibrinous matter with salts and a trace of oil. In the long bones of a healthy adult mammal, the marrow occurs as a yellow, oily fluid, contained in vesicles like those of common fat, which are imbedded in the interspaces of the medullary membrane, which is a highly vascular membrane lining the interior of the bones. This marrow consists of 96 per cent. of oil, and 4 of water, connective tissue, and vessels. The oily matter of the marrow is composed of the same materials as common fat, with the oleine (or fluid portion) in greater abundance. Being of low specific gravity, it is well suited to fill the cavities of the bones, and forms an advantageous substitute for the bony matter which preceded it in the young animal. Its special uses are not clearly known, but the fact that it loses much of its oil when the general nutritive powers fail, or when certain forms of disease attack the bone, shows that it serves some definite purpose in the economy.

MARROW CONTROVERSY: one of the most strenuous and memorable struggles in the religious history of Scotland, named from a book, *Marrow of Modern Divinity*, written by a Puritan soldier in the time of the Commonwealth. The highly 'evangelical' character of this work, and especially its doctrine of the free grace of God in the redemption of sinners, had made it a great favorite with the few zealous and pious ministers then found in the Church of Scotland: and 1718, an edition was published by the Rev. James Hog of Carnock, followed, 1719, by an explanatory pamphlet. The general assembly of the same year appointed a commission to look after books

and pamphlets promoting such opinions as are contained in the *Marrow*, and to summon before them the authors and recommenders of such publications. The committee, after examination, drew up a report, to the assembly of 1720; and the result was the formal condemnation of the doctrines of the *Marrow*, a prohibition of teaching or preaching them, and an exhortation (strong, but vain) to the people of Scotland not to read them. This act of the assembly was immediately brought by the celebrated Thomas Boston (q.v.) before the presbytery of Selkirk, which in turn laid it before the synod of Merse and Teviotdale. The 'evangelical' ministers in the church, few in number, but supported by considerable popular sympathy (for the *Marrow* by this time ranked next to the Bible in the regards of the religious portion of the Scottish peasantry), resolved to present a representation to the next general assembly (1721), complaining of the late act, and vindicating the 'truths' which it condemned. 12 ministers signed the representation—James Hog, Thomas Boston, John Bonnar, James Kid, Gabriel Wilson, Ebenezer Erskine, Ralph Erskine, James Wardlaw, James Bathgate, Henry Davidson, William Hunter, and John Williamson. These are the famous 'Marrow-men'—known also as the 'Twelve Brethren' and the 'Representers'—whose names were long held in veneration by the lovers of 'evangelical' religion. A commission of the assembly of 1721 was appointed to deal with the 12, and a series of questions was put to them, to which answers were drawn up by Ebenezer Erskine and Gabriel Wilson. These replies did not prove satisfactory, and the 'Marrow-men' were called before the bar of the assembly (1722), and solemnly rebuked. Nevertheless, as the assembly was not supported in its position by the religious sentiment of the nation, no further steps were taken in the matter; thus the victory virtually was with the evangelical recusants. It was, however, substantially the same controversy—though it did not go by the name—which, eleven years later, resulted in the deposition of Ebenezer Erskine, and the origination of the 'Secession' body. See BOSTON, THOMAS: ERSKINE, EBENEZER.

MAR'RUM: see AMMOPHILA.

MARRY, v. *măr'rĭ* [F. *marier*, to marry—from L. *maritārĕ*, to marry: F. *mari*; L. *marītus*, a husband (see MARRIAGE)]: to unite a man and woman as husband and wife; to give or dispose of in marriage; to enter into wedlock; among *seamen*, to splice ropes, that is, to interweave one end of a rope into that of another. MARRYING, imp. *măr'rĭ-ĭng*. MAR'RIED, pp. *-rĭd*: ADJ. united in marriage; wedded.

MARRY! int. *măr'rĭ*: a term of asseveration, from the Virgin *Mary*; by Mary! indeed! forsooth!

MARRYAT, *mär'ĭ-at*, FREDERICK: English sailor and novelist: 1792, July 10—1848, Aug, 2; b. London; son of a wealthy W. India merchant. On leaving school, he

entered the navy as a midshipman under Lord Cochrane. In 1812, he attained his lieutenancy, and was made commander 1815. While afloat, he saw much active service, established a high character for bravery, and was made a C.B. 1825, June. About 1830, he retired from the naval service, and wrote his first novel, *Frank Mildmay,* rapidly followed by those graphic and humorous pictures of sea-life which have taken a permanent place in every English circulating library. Marryat died at Langham, Norfolk; he was married, and left six children. The freshness of the new field was an acceptable surprise to the world of novel-readers; and Capt. Marryat's vividness of description, humorous portraiture, and wealth of incident commended his works to all classes. In 20 years of authorship he produced 24 vols.: the most popular are, perhaps, *Midshipman Easy, Peter Simple, Jacob Faithful, Snarley-yow, or the Dog Fiend,* and *Japhet in Search of a Father.* His fictions are full of adventure and broad humor—since Smollett's, no novels have caused so much laughter.—His daughter, Florence Marryat (b. Brighton, England, 1838, July 9; d. London, 1899, Oct. 27), published a long series of novels, and the *Life and Letters* of her father (1870).

MARS, n. *mârz* [L. *Mars,* god of war]: one of the smaller planets, situated between the earth and Jupiter, 141,000,000 miles from the sun. Its diameter is 4,200 miles. Its years contain 687 days. Its mean distance at opposition from the earth is 48,000,000 miles. The day on Mars is half an hour longer than ours, or about 24 hours and 37 minutes. It has two moons. It moves at the rate of 15 miles a second. Mars is the fourth planet from the sun, and is called the red planet, from its well-known color. The combination of its motion with ours causes it to pass behind us, or opposite to the sun, once in two years. For two months at this period it is best seen, and appears as a red lamp in the sky; at other times it looks small and unimportant. Its density and size are less than ours; a man weighing 200 pounds here would weigh but 75 pounds on Mars. The orbit of this planet is decidedly elliptical; it is 26,000,000 miles nearer the sun at the nearest part of its orbit than it is at the farthest, consequently the variation in heat from this cause alone is considerable. In many ways Mars resembles our earth; it has atmosphere, seasons, land, water, storms, clouds, and mountains. Snow and ice cover both its poles, and produce great white patches at those points, which are clearly seen through a large telescope; they are found to vary in size with the seasons, being largest during the Martian winter. The canals were first mapped in large numbers by Schiaparelli, although a few of them had been previously observed by other astronomers. They consist of narrow dark lines, generally straight, forming a network over the whole surface of the planet. At their junctions we often find small

black dots, known as lakes or oases. Large areas of the planet, called seas, are of a dark gray color, but most of the surface is yellow, or, if observed by daylight, orange. The cause of all the dark regions is probably vegetation, with the exception of the two very black lines which are seen to surround the snow caps when they are melting. These two lines are temporary in their nature, and form the only true oceans of the planet. Occasionally they attain a breadth in some places of 300 or 400 miles, and are then found to be of a dark blue color. The polariscope shows that, unlike the rest of Mars, their surfaces are shiny. The yellow regions are thought to be deserts. They cover more than half the entire surface. Very marked changes sometimes appear in the finer details when the snow is melting most rapidly. At the approach of the Martian autumn those parts of the dark areas that are near the poles are seen to fade out and turn yellow so as to be indistinguishable from the soil of the planet.

The moons of Mars were discovered by Asaph Hall in 1877. The outer and smaller one is probably less than 10 miles in diameter. The inner one revolves about the planet in seven hours and a half, apparently rising in the west, and goes through all its phases in a single night.

MARS, *mârz* [contraction of MAVERS or MAVORS; in the Oscan or Sabine language, MAMERS]: ancient Italian divinity identified by the Græcizing Romans with the Thracian-Hellenic *Ares*. Two conceptions of him are thus presented.

The Roman Mars, who as a war-god is surnamed *Gradivus* (= *grandis divus*, the great god), bore also the surname *Silvanus*, and appears to have been originally an agricultural deity; and propitiatory offerings were presented to him as the guardian of fields and flocks. He was god of the heavens, wielder of thunder, sender of rain, giver thus of fertility and increase. But as the fierce shepherds who founded the city of Rome were more addicted to martial than to pastoral pursuits, it is evident how easily in the course of time *Mars Silvanus* should have become the 'God of War.' Mars, who was a perfect personification of the stern, relentless, cruel valor of the old Romans, was held in highest honor. He ranked next to Jupiter; like him he bore the venerable epithet *Father* (Mars-*piter*); he was one of the three tutelary divinities of the city, to each of whom Numa appointed a flamen; he was even said to be the father of Romulus himself (by Rhea Silvia, priestess of Vesta), and was thus believed to be the real progenitor of the Roman people. He had a sanctuary on the Quirinal; and the hill received its name from his surname, *Quirinus*, the most probable meaning of which is *the spear-armed*. Under this designation he was invoked as the protector of the *Quirites* (citizens)—in other words, protector of the state. The

principal animals sacred to him were the wolf and the horse. He had many temples at Rome, the most celebrated of which was that outside the *Porta Capena*, on the Appian Road. The *Campus Martius*, where the Romans practiced athletic and military exercises, was named after him; so was the month of March (*Martius*), the first month of the Roman year. The *Ludi Martiales* (games in his honor) were celebrated every year in the circus, Aug. 1.

ARES, Greek god of war, was the son of Zeus and Hera: and the favorite of Aphrodite, who bore him several children. When Mars became identified with the Greek Ares in the Roman mind, he was regarded as almost equivalent to the warlike element in Jupiter, according to the imported tendency to consider Jupiter as the great and central god whose various special characteristics were represented by the other deities. He is represented in Greek poetry as a most sanguinary divinity, delighting in war for its own sake, and in the destruction of men. Before him into battle goes his sister *Eris* (Strife); with him are his sons and companions, *Deimos* (Horror) and *Phobos* (Fear). He does not always adhere to the same side, like the great *Athena*, but inspires now the one, now the other. He is not always victorious. Diomede wounded him, and in his fall, says Homer, 'he roared like nine or ten thousand warriors together.' Such a representation would have been deemed blasphemous by the ancient Roman mind, imbued as it was with a solemn Hebrew-like reverence for its gods. The worship of Ares was never very prevalent in Greece; it is believed to have been imported from Thrace. There, and in Scythia, were its great seats, and there Ares was believed to have his chief home. He had, however, temples or shrines at Athens, Sparta, Olympia, and other places. On statues and reliefs, he is represented as a person of great muscular power, and either naked or clothed with the chlamys.

MARSALA, *mâr-sâ'lâ*: large fortified seaport on the w. coast of Sicily, in a fruitful, well-cultivated district; a regularly built and pleasant town, with a college, a cathedral, a gymnasium, and several conventual establishments. It occupies the site of Lilybæum, anc. cap. of the Carthaginian settlements in Sicily, and was selected by Garibaldi as the landing-point of his volunteers in his famous Sicilian campaign 1860. It obtained its present name from the Arabs, who, when they held Sicily, esteemed this part so highly that they called it *Marsa Alla*, 'Port of God.' Its harbor is encumbered with sand, but its celebrated wines form an export trade of great importance, chiefly since 1802, when they were adopted by Lord Nelson for the use of the British fleet. 30,000 pipes of M. wine, which resembles sherry, are annually manufactured, two-thirds being exported. M. has also a large export trade in grain, oil, salt, and soda. Pop., commune (1871) 34,200; (1881) 40,250; town (1891) 34,202.

MARSALA, n. *mâr'sa-la:* a Sicilian wine, so named from the seaport whence exported.

MARSDEN, *mârs'dĕn*, SAMUEL: 1764–1838, May 12; b. England: Episc. missionary. He received a common-school education at Hull; engaged in mercantile business at Leeds; was a member of the Wesleyan Church till a desire for a collegiate education induced him to unite with the Church of England and enter St. Joseph's College, Cambridge; was ordained 1793; and in the following year accepted the appointment of chaplain to the new penal colony at Paramatta, Australia. Part of his salary was a grant of land and the use of a number of convicts to cultivate it. With these he soon established a model farm, used the profits to open schools and missions, and began training the convicts in industrial habits. Returning to England 1809, and failing to induce the Church Missionary Soc. to send missionaries to the New Zealand Maories, he prevailed on two laymen, William Hall and John King, to accompany him. At Australia he purchased a vessel, *The Active*, and in it visited New Zealand with his associates, and established a mission. He made seven visits to the Maories, and was largely instrumental in their remarkable Christianization and civilization.

MARSEILLAISE, or MARSEILLAISE HYMN, n. *mâr'sālyāz':* name by which the grand song of the first French Revolution is known. In the beginning of 1792, when a column of volunteers was about to leave Strasburg, the mayor of the city, who gave a banquet on the occasion, asked an officer of artillery, Rouget de Lisle, to compose a song in their honor: the result was the M.—both verse and music being the work of a single night. De Lisle entitled the piece *Chant de Guerre de l'Armée du Rhin.* Next day, it was sung with the rapturous enthusiasm characteristic of the French; and, instead of 600 volunteers, 1,000 marched out of Strasburg. Soon from the whole army of the north resounded the thrilling and fiery words *Aux armes, Aux armes;* nevertheless, the song was still unknown at Paris, and was introduced there by Barbaroux, when he summoned the youth of Marseille to the cap. 1792, July. It was received with transports by the Parisians, who—ignorant of its real authorship—named it *Hymne des Marseillais.*

MARSEILLES, *mâr-sâl'yĕh* or *mâr-sā'yĕh:* third largest city and chief seaport of France, chief port also of the Mediterranean; in the dept. of Bouches-du-Rhone, on the Gulf of Lyon, 410 miles in direct line s.s.e. of Paris, lat 43° 17′ n., long. 5° 22′ e. M. is a military place of the fourth class, and is defended by a citadel and other works; the roads are protected by the fortified isles of If (crowned by a castle, formerly a state-prison), Pomegue, and Ratonneau. Its harbor is formed by an inlet of the sea running eastward into the heart of the city, and covering nearly 70 acres. It has natural and artificial advantages, and can accommodate 1,200 vessels. The

new harbor consists of a series of docks or *bassins* (*de la Joliette, de l'Entrepôt, Napoléon, Impérial*), more than a mile long, with an area abt. 288 acres: other port accommodations make a total of 422 acres; but the 4½ m. of quays are inadequate for the immense annual traffic of more than 3,400,000 tons. Alongside the Bassins de l'Entrepôt and Napoléon are the bonded warehouses (cost $5,000,000), finest of the kind in Europe. From the margin of the old harbor, the ground rises on all sides, forming a kind of amphitheatre; and beyond the city proper the encircling hills, covered with vineyards and olive-gardens, are dotted with white country-houses. Immediately n. of the harbor is the old town, with its narrow streets, lined with high closely-piled houses; but through it a wide avenue, with branches, has recently been opened. South of the old harbor is the church of St. Victor, the most ancient in M.; and farther s. rises the rocky hill of *Notre Dame de la Garde*, with its church, held in the highest veneration by the sailors of the Mediterranean. At the foot of the hill is the wide promenade, Cours Bonaparte. Other fine promenades are Le Cours and Le Prado. The principal public buildings are the Hôtel de Ville, the museum, the public library with 78,000 vols., and the exchange. The *cafés* and shops of M. rival those of Paris in splendor. M. is the first commercial emporium of France. It has many soap-works, iron-manufactories, sugar refineries, etc. The large vessels and steamers annually entering its harbor number more than 8,600, tonnage more than 2,600,000. M. is directly connected by rail with Lyon, Toulouse, and Nice; and is the packet station for Italy and the East. The formerly barren country round M. has been of late greatly fertilized by the canal which supplies M. with water from the Durance: this aqueduct is 94 m. long, 15 m. under ground. During a portion of the year, the climate of M. is delightful, but in summer and autumn the heat is often intense. Cold, dry, and cutting winds from the n.e. render the climate at times exceedingly trying. In the environs are about 6,000 *bastides*, or country villas.

M. was founded by a Greek colony from Phocæa, in Asia Minor, about B.C. 600. Its ancient name was *Massalia*, written by the Romans *Massilia*. It was an important member of the ancient Greek community, planted numerous colonies along the n. Mediterranean shores, and introduced the germs of Greek civilization into Gaul. The Massaliots were long in intimate alliance with the Romans; but the city was at last taken by Julius Cæsar. In the 8th c. it was destroyed by the Arabs, and the maritime republics of Italy inherited the commerce of the Mediterranean, which formerly had been centred here. It was united, with the whole of Provence, to France in the reign of Charles VIII. In 1720, when it had again risen to importance, it was ravaged by a fearful epidemic, which swept away 40,000 of its inhabitants. Since 1830, the commerce and industry of the city have increased vastly. The conquest of

Algeria has brought increasing prosperity to Marseilles, and its n. African trade is now an important part of its commerce. Pop. (1891) 403,749; (1900) 491,161.

MARSH, n. *mârsh* [F. *marais*, a marsh—from OF. *maresc*—from mid. L. *mariscus:* OE. *mareis;* Dut. *maerasch;* It. *marese*, a marsh, a moorish or fenny place]: a tract of low land too wet for tillage; a fen. MARSHY, a. *mârsh'ĭ*, wet; fenny. MARSH'INESS, n. *-nĕs*, state of being marshy. MARSH-ELDER, the guelder-rose. MARSH-GAS, the fire-damp, or light carburetted hydrogen, evolved from marshes and stagnant pools (see METHANE). MARSH-HAWK (see HARRIER). MARSH-HEN (see RAIL). MARSH-TREFOIL, water-plant, called *Beg-bean*, or *Buck-bean* (q.v.).

MARSH, GEORGE PERKINS, LL.D.: philologist and diplomatist: 1801, Mar. 17—1882, July 24; b. Woodstock, Vt. He graduated at Dartmouth College 1820; studied law and practiced at Burlington, Vt.; was elected to the executive council of the state 1835, and to congress 1842 and 49. He was appointed U. S. minister at Constantinople 1849, and was charged with a special mission to Greece 1852. He travelled in n. Europe, and became adept in the Scandinavian languages. In 1861, he was appointed U. S. minister at Rome; and died in that office, at Vallambrosa. Dr. Marsh was an earnest and profound philological student. His most important works are a *Grammar of the Old Northern or Icelandic Language* (compiled 1838); *The Camel, his Organization and Uses* (1856); *Lectures on the English Language* (1861); *The Origin and History of the English Language* (1862); *Man and Nature*—largely re-written and issued under the title, *The Earth as Modified by Human Action* (1874).

MARSH, JAMES, D.D.: 1794, July 19—1842, July 3; b. Hartford, Vt.: Congl. minister, educator. He graduated at Dartmouth 1817; was tutor there 1818-20; graduated at Andover Theol. Seminary 1822; ordained 1824; professor of modern languages in Hampden-Sidney College, Va., 1824-26; president of the Univ. of Vt. 1826-33; and professor of moral and intellectual philosophy there 1833-42. He received his degree from Columbia 1830 and Amherst 1833. His literary work, which was large and important, included a series of papers to the *Vermont Chronicle* on *Popular Education*, under the pen name *Philopolis; a Preliminary Essay* in Coleridge's *Aids to Reflection* (Burlington 1829); *Selections from the Old English Writers on Practical Theology* (1830); and several translations from the German, including Herder's *Spirit of Hebrew Poetry*, 2 vols. (1823). See his *Remains*, with Memoir by Joseph Torrey (Boston 1843; 2d ed. 1845).

MARSH, OTHNIEL CHARLES, PH.D., LL.D.: naturalist: b. Lockport, N. Y., 1831, Oct. 29; d. New Haven, Conn.,

1899, Mar. 18. He graduated at Yale 1860; studied mineralogy and paleontology in the Sheffield Scientific School at Yale 1860-62, and zoology, geology, and mineralogy in the universities of Berlin, Heidelberg, and Breslau 1862-65; was appointed to the new chair of paleontology in Yale 1866, which he held till 1899; became paleontologist in charge of the division of vertebrate paleontology in the U. S. Geological Survey 1882; was elected president of the American Assoc. for the Advancement of Science 1878, and president of the National Acad. of Sciences 1883; and held membership in the chief American and European scientific societies. His great work was the investigation of the extinct animals of the Rocky Mountain region of N. America, in which he crossed the mountains more than 20 times, and discovered more than 200 fossil animals previously unknown. In 1876, he began preparing a series of monographs of his western discoveries for publication by the government, which comprise *Odontornithes, or Birds with Teeth* (Washington 1880); *Dinocerata* (1884); the dinosaurs of the order Sauropoda; the Stegosauria, reptiles; the Brontotheridæ; and others—all profusely illustrated. In 1875, he made a memorable exposure of the fraudulent treatment of the Indians, which led to the adoption of reformatory measures. In 1877, he received the Bigsby medal for paleontological discoveries from the Geological Soc. of London, of which he was a fellow; and 1886 received the degree PH.D. from the Univ. of Heidelberg and LL.D. from Harvard. In 1890, Jan., scientific circles in the United States were excited by the publication by Prof. Edward Drinker Cope, of the Univ. of Penn., of charges affecting the official and professional character of Maj. John W. Powell, director of the U. S. Geological Survey, and his chief assistant, Prof. Marsh. Prof. Cope charged Marsh with plagiarism and gross ignorance, and both Marsh and Maj. Powell with incompetence in the performance of their important public duties, and supported his charges with documentary evidence. This publication brought denials from Marsh and Maj. Powell, and counter charges against Prof. Cope. His will divided a considerable estate between National Acad. Sciences and Yale University.

MARSHAL, n. *mâr'shal* [mid. L. *mariscal'cus,* the master of the horse—from O.Ger. *mähre,* a horse; *schalk,* a servant: F. *maréchal;* OF. *mareschal,* one who shoes and takes care of horses]: *anciently,* officer under whose cognizance fell everything pertaining to the use of arms, the regulation of tournaments, etc.: a master of ceremonies; in *U. S.,* a civil officer of a district: V. to dispose or arrange in order. MAR'SHALLING, imp.: N. act of arranging in proper order. MAR'SHALLED, pp. *-shald:* ADJ. arranged in proper order. MAR'SHALLER, n. one who disposes in proper order. MAR'SHALSHIP, n. the office of a marshal. EARL-MARSHAL, in *Eng.,* the eighth

great officer of state, hereditary in the family of the Duke of Norfolk. FIELD-MARSHAL, highest military rank in the British army.

MAR'SHAL: a term, in its origin, meaning a groom or manager of the horse, though eventually the king's marshal became one of the principal officers of state in England. The royal farrier rose in dignity with the increasing importance of the *chevalerie*, till he became, jointly with the Constable (q.v.), the judge in the *Curiæ Martiales*, or courts of chivalry. An earldom is attached to the dignity, and the office of earl-marshal is now hereditary in the family of the Duke of Norfolk. When the king headed his army in feudal times, the assembled troops were inspected by the constable and marshal, who fixed the spot for the encampment of each noble, and examined the number, arms, and condition of his retainers. With these duties was naturally combined the regulation of all matters connected with armorial bearings, standards, and ensigns. The constable's functions were virtually abolished in the time of Henry VIII., and the marshal became thenceforth the sole judge in questions of honor and arms. The earl-marshal is president of the English College of Arms, and appoints the kings-at-arms, heralds, and pursuivants. The marshal's functions were formerly exercised in time of peace in the *Aula Regis* or King's Great Court, and on the division of the *Aula Regis*, he appointed deputies in the new courts; hence arose the offices of marshal of the king's (or queen's) bench and of exchequer, whose principal duty is to take charge of persons committed to their custody by the court. Besides the earl-marshal, there is a knight-marshal, or marshal of the king's (or queen's) household. The marshal or provost-marshal of the admiralty is an officer whose duty it is to act ministerially under the orders of the court of admiralty in securing prizes, executing warrants, arresting criminals, and attending their execution. The dignity of marshal existed formerly in Scotland, where a different orthography was adopted, and the office of marischal was hereditary in the family of Keith. In France, the highest military officer is called a marshal, a dignity which originated early in the 13th century. There was at first only one *Maréchal de France*, and there were but two till the time of Francis I. Their number afterward became unlimited. Originally, the marshal was the esquire of the king, and commanded the vanguard in war; in later times, the command became supreme, and the rank of the highest military importance. From the title of this class of general officers, the Germans have borrowed their feld-marschall, and we our field-marshal, a dignity bestowed on commanders distinguished either by elevated rank or distinguished service. See FIELD-MARSHAL, under FIELD.

In the United States, marshal is a civil official of U. S. courts, one being appointed by the President for each U.

U. S. judicial district; his duties correspond to those of sheriff in state courts. The U. S. marshal with his deputies enforces the statutes of the federal government in his district. In some southern and western states the head of a municipal police force is called a marshal; he is an official distinct from the sheriff of the county, and from a constable of a justice court. The name has been improperly applied sometimes to volunteer police officers called into service for a special time and purpose.

MARSHALL, *mâr'shal:* Ill., city, county-seat of Clark county; on the Vandalia Line and the Cleveland, C., C. & St. L. railroad; about 122 miles east by south of Springfield and 15 miles west by south of Terre Haute, Ind. It is in an agricultural and stock-raising region. Its chief manufactures are flour, woolen goods, condensed milk and other dairy products, and lumber. It has considerable trade in farm products, live-stock, and condensed milk. Pop. (1900) 2,077; (1910 est.) 3,197.

MARSHALL: Mich., city, county-seat of Calhoun county; on the Kalamazoo river, and on the Michigan C. and Cincinnati, J. & M. railroads; about 38 miles south by west of Lansing and 100 miles west of Detroit. The surrounding country is devoted chiefly to agriculture. The principal manufactures are school and church furniture, hot-air furnaces, patent medicines, breakfast food, flour, bicycles, wagons and carriages, windmills, bathtubs, electrical supplies, caskets, and agricultural implements. Marble and granite works employ a number of men. The grounds of the County Agricultural Society are located in Marshall. The electric-light plant and the waterworks are owned and operated by the city. Pop. (1900) 4,370; (1910 est.) 4,690.

MARSHALL: Minn., city, county-seat of Lyon county; on the Redwood river, and on the Chicago & N. W. and the Great N. railroads; about 160 miles west by south of Saint Paul. It is in an agricultural section in which wheat is the principal product. The industrial establishments are a flour mill, grain elevators, and a creamery. The principal buildings are the county court-house and the jail. The educational institutions are the public and parish schools, Holy Redeemer Academy, and a public library. Pop. (1900) 2,088; (1910 est.) 3,187.

MARSHALL: Mo., city, county-seat of Saline county; on the Missouri P. and the Chicago & A. railroads; about 80 miles east of Kansas City. It was settled in 1839 by people from Virginia and Kentucky, and was incorporated as a city in 1866. It is situated in an agricultural region; in the vicinity are valuable deposits of coal and salt, and nearby are stone quarries. The manufactures are lumber, tile and brick, flour, canned goods, creamery products, wagons and carriages. It is the seat of the State Institution for Feeble Minded and Epileptics; the Missouri Valley College (Cumberland Presbyterian),

established in 1889; San Saviour Academy (R. C.). There are eight churches and public and parish schools. Marshall has four banks with a combined capital of $300,000. The government is vested in a mayor, city marshal, and a council of six members, who are elected every two years. Pop. (1900) 5,086; (1910) 4,869.

MARSHALL: Texas, county-seat of Harrison county, is situated about 14 miles north of Sabine river, 40 miles west of Shreveport and 67 miles south of Texarkana. The city was founded in the year 1840. Marshall is situated in the midst of a fertile agricultural region which has heretofore engaged mostly in cotton raising, but recent developments show that this section is well adapted to truck growing and the raising of fruits, especially peaches, and large orchards are being planted. The city is largely supported, also, by lumber interests, there being large areas of pine timber contiguous to the city, which is rapidly being marketed. Stock raising is also carried on. The Texas & Pacific railroad runs through the city. The Texas Southern railroad has its terminus, at present, at Marshall, but will be pushed farther south. The shops of the Texas & Pacific railroad are located at Marshall. Locomotives and all kinds of rolling stock are manufactured. These shops employ 900 men and have a local pay-roll of $50,000 a month. The local shops and general offices of the Texas Southern railroad are also located in Marshall. Marshall has, in addition to the railroad shops, a cotton-seed oil mill; a large compress; car-wheel and foundry plant; wagon factories; a soda-water apparatus factory; and various other minor manufactories. The city has installed complete sewerage and waterworks plants.

Religiously, all the various denominations are represented, and have commodious houses of worship. The school system of the city is run on the latest and best methods, having three ward schools and a centrally located high school, well equipped with teachers and appliances. The public free schools are open nine months in the year. The total value of the city school property is $100,000. There are, also, a number of private schools. There are three Catholic schools in the city—one for girls and one for boys, and an industrial school for boys. In the city are also located Wiley University and Bishop College, institutions for the education of the negroes.

The city has two national banks, morning and evening daily papers, also a weekly paper and *The Messenger Monthly Magazine*. Marshall and vicinity is noted for the medicinal properties of its many springs and wells, and many people annually, especially during the summer season, visit these places as health resorts. Hartley's Well, situated within the corporate limits of the city of Marshall, is said to have wonderful curative qualities. Hynson's Iron Mountain Springs, situated five miles west,

and the Rosborough Springs, situated nine miles south, are also noted for their health-giving qualities. Pop. (1910) 11,452.

MARSHALL, *mâr'shal,* ALFRED, D.SC., LL.D.: English economist: b. London, 1842, July 26. He was educated at St. John's College, Cambridge, and in 1877 was principal of University College, Bristol. In 1883-4, he was lecturer at Balliol College, Oxford; since 1885 has been professor of political economy at Cambridge University; and has been a member of various public boards. He has published: *Economics of Industry* (1879); *Principles of Economics* (1890); *Elements of Economics* (1891); *The New Cambridge Curriculum in Economics* (1903); etc.

MARSHALL, ARTHUR MILNES, M.D., D.SC., F.R.S.: English naturalist: b. Birmingham, England, 1852; d. 1893, Dec. 31. He entered London University and in 1870, at the age of 18 years, received his degree of B.A.; in 1871, he entered St. John's College, Cambridge, from which he graduated as senior in the natural science tripos in 1874. He was sent by the University of Cambridge in the following year to its zoological station in Naples, but after studying there for a few months returned to Cambridge and assisted Professor Balfour in organizing the classes of comparative morphology; at this time also he took up the study of medicine. In 1879, he was appointed professor of zoology at Owens College, Manchester; in 1885, was elected a fellow of the Royal Society; in 1887, entered St. Bartholomew's Hospital; in the same year was elected a fellow of St. John's College; subsequently took his degree of M.D. at Cambridge; in 1891-2 was a councillor of the Royal Society; and in 1892 presided over a section of the British Association. He was largely instrumental in organizing the biological classes at Victoria University. Though particularly distinguished as a teacher and organizer his publications added much to the scientific knowledge of embryology. They include *The Frog: an Introduction to Anatomy and Histology* (London 1883; 7th ed. 1900); *The Segmental Value of the Cranial Nerves* (1882); *Vertebrate Embryology* (1893); and numerous papers in the *Quarterly Journal of Microscopical Science.* His *Biological Essays and Addresses* and *Darwinian Theory* were published posthumously.

MARSHALL, EDWARD: American journalist: b. Enfield Centre, N. Y., 1868, May 31. He was educated in the public schools at Rochester and entered journalism in New York city, where he conducted an editorial crusade against the conditions existing in tenement buildings. He has been connected with leading New York newspapers and was special correspondent during the Spanish-American war. He has published *The Rough Riders* (1898); *Lizette* (1902); *The Middle Wall* (1904); *By Wireless* (1907); etc.

MARSHALL, Emma Martin: English novelist: b. North Repps, near Cromer, Norfolk, 1830, Sep. 29; d. Clifton, near Bristol, 1899, May 4. She was married to H. G. Marshall in 1851, and her life thereafter was mainly spent in the cathedral towns of Wells, Exeter, Gloucester, and Bristol. She wrote more than 100 volumes, nearly all of them stories intended mainly, though not entirely, for young people. In spite of their number the even excellence of the tales is remarkable, and they may be called historical pictures rather than historical tales. Her plan was to introduce into each story several historical personages, as secondary characters, the principal figures being imaginary. Her books have had a wide reading in the United States and still continue popular. Among them are: *Under Salisbury Spire* (1889); *In the East Country with Sir Thomas Browne; Haunts of Ancient Peace; In the Choir of Westminster Abbey in the Time of Henry Purcell* (1897); *Under the Dome of St. Paul's* (1898). Consult: B. Marshall, *Life of Emma Marshall* (1900).

MARSHALL, Henry Rutgers, A.M., L.H.D.: American author and architect: b. New York city, 1852, July 22. He was graduated at Columbia in 1873, and in 1878 entered practice as an architect. In 1902, he was appointed a member of the Art Commission of the City of New York. Besides contributions to literary, philosophical, and psychological periodicals, he wrote: *Pain, Pleasure, and Æsthetics* (1894); *Æsthetic Principles* (1895); and *Instinct and Reason* (1898).

MARSHALL, Humphrey: American botanist: b. West Bradford (the present Marshallton), Pa., 1722, Oct. 10; d. there, 1801, Nov. 5. He followed the stonemason's trade, but devoted his leisure to astronomy, building a small private observatory, and to natural history. He began the collection and cultivation of the more interesting indigenous plants, and in 1773 established the Marshallton botanical garden, where were assembled trees and herbaceous plants of the United States. For years he was treasurer of Chester county, Pa., and in 1786 he was elected to the American Philosophical Society. His *Arboretum Americanum*, described as 'an Alphabetical Catalogue of Forest Trees and Shrubs, Natives of the American United States' (1785), was translated into several European languages.

MARSHALL, Humphrey: American politician: b. Westmoreland county, Va., 1756; d. near Frankfort, Ky., 1841, July 1. He joined the Continental army at the outbreak of the Revolution, became captain of Virginia cavalry (1778), in 1780 established himself on a Kentucky plantation, opposed the separation of Kentucky from Virginia, and as a delegate to the Danville convention of 1787 was prominent in defeating the measure. He was also a delegate to the Virginia convention that ratified the constitution of the United States, and in

1793 was a representative from Woodford county in the Kentucky legislature, where he declared his opposition to the plans for raising in Kentucky troops under Gen. George Rogers Clark for an attack on the Spanish settlements near the mouth of the Mississippi river. From 1795, Dec. 7, to 1801, Mar. 3, he was a Federalist senator in the Congress of the United States, and in 1806 was active in denunciation of Aaron Burr. He represented Franklin co. in the Kentucky legislature in 1807-9, and had a dispute with Henry Clay which resulted in a duel in which Clay received a slight wound. He sat again for Franklin co. in 1823. He published the first *History of Kentucky* (1812; rev. ed. 1824).

MARSHALL, HUMPHREY: American soldier: b. Frankfort, Ky., 1812, Jan. 13; d. Louisville, Ky., 1872, Mar. 28. He was graduated from the United States Military Academy in 1832, entered the mounted rangers, served in the Black Hawk war (1832), and resigned from the army 1833, Apr. 30. Admitted to the bar in 1833, he practiced in Frankfort (1833-4) and Louisville (1834-6), became a lieutenant-colonel of Kentucky militia in 1841, and raised for the Mexican war the first regiment of Kentucky cavalry, of which he was made colonel, 1846, June 9. He fought at Buena Vista 1847, Feb. 22-23. From 1849, Dec. 3, to 1852, Aug. 4, he served as a Whig in the 31st and 32d Congresses; in 1852-4 was minister plenipotentiary to China, and from 1855, Dec. 3, to 1859, Mar. 3, was again in Congress, this time as an American, or Know-Nothing. In 1861 he was commissioned a brigadier-general in the Confederate army, with command of the Army of Eastern Kentucky. On Jan. 10, 1862, he was defeated by Gen. Garfield at Middle Creek (Floyd co.) in one of the most important of the minor battles of the Civil war. In 1862, May, he surprised Gen. J. D. Cox at Princeton, Va., and was thus of much service to Lee through the relief of the Lynchburg & Knoxville railway. Having resigned his commission in 1862, he represented Kentucky in the congress of the Confederate States (1863-5). From 1867 he practiced law with much success at Louisville.

MAR'SHALL, JOHN, LL.D.: chief-justice of the United States: 1755, Sept. 24—1835, July 6; b. Fauquier co., Va.; eldest of 15 children of Col. Thos. Marshall. After studying with his father he went to school at Westmoreland at the age of 14, and studied later under a private tutor, until at the age of 18 he began the study of law. In 1775 he left his studies uncompleted, and joined a military company in a regiment in which his father was major. He distinguished himself at the battle of Great Bridge; 1776, July, he was made lieutenant in the 11th Virginia regiment and went north; 1777, May, he became captain, and was in active service till the close of 1779, taking part in the battles of Brandywine, Germantown, Monmouth, and minor engagements, and sharing the hardships of Valley Forge, where he gained the esteem of

Memories of a Musical Life (1901); etc. His compositions comprise more than 40 pieces for the pianoforte, a few for concert use, but mainly 'pièces de salon,' or chamber music. Mason received the degree MUS.DOC. from Yale Univ. 1872.

MASON, WILLIAM: English poet: b. Hull, 1724, Feb. 12; d. York, 1797, Apr. 7. He was educated at Cambridge, and his first publication was *Isis*, a poem, satirizing the Jacobitism and high church principles which prevailed in the University of Oxford. In 1852, he published *Elfrida*, a tragedy, with choral odes, on the ancient Greek model. Having taken orders in the church he obtained the living of Aston, in Yorkshire, and was appointed one of the royal chaplains. In 1759, appeared *Caractacus*, a drama. Some years after Mason was made precentor and residentiary canon at York. One of his principal works, the *English Garden*, a poem, appeared between 1772 and 1782; and was translated into French and German. In 1775, he published the poems of his friend Thomas Gray (q.v.), with memoirs of his life. His principal subsequent publications are: *Odes; Life of William Whitehead*, with his poems (1788); *Essay on Church Music* (1795).

MA'SON AND DIX'ON'S LINE: boundary e. and w. line, 280 m. long, separating Pennsylvania on the n. from West Virginia, Maryland, and Delaware on the s. It begins at the n.e. corner of Maryland, and runs due w. on the parallel of lat. 39° 43′ 26.3″ n. to the s.w. corner of Pennsylvania. It was, in the e. Atlantic states, the boundary between slave and free soil, which further w. followed the line of the Ohio river to the Mississippi, and was fixed for the territories beyond the Mississippi by the Missouri Compromise of 1820, at the parallel of 36° 30′. The name Mason and Dixon's Line has been popularly applied to the whole divisory line between free and slave soil, but properly it belongs only to the s. boundary of Pennsylvania, surveyed by Charles Mason (q.v.) and Jeremiah Dixon 1763-67.

From 1681 to 1768 the want of a settled boundary between Pennsylvania and its s. neighbors, Maryland and Virginia, occasioned dissensions and sometimes bloodshed along the border. The original grants to William Penn and Lord Baltimore fixed the 40th par. of lat. n. as the boundary between the two colonies. That line was, however, found to pass so far north as to put Penn's settlement at Philadelphia into Maryland, and to exclude Pennsylvania from Delaware Bay. To remedy this result of royal ignorance of the geography of the region, negotiations were undertaken, which succeeded only after nearly a hundred years of serious trouble. The small territory of Delaware was purchased 1682 by Penn, but continued, as 'the three lower counties,' to have its separate assembly at New Castle. After Penn's death, 1718, a suit between his heirs and those of Lord Baltimore was

begun, to settle their respective bounds, and involving the question to whom Delaware belonged. In 1732, May 10, the parties came to an agreement to have the lines s. and e. of Delaware and between Pennsylvania and Maryland properly surveyed. For the upper end of Delaware, where New Castle was almost in Pennsylvania, it had been agreed to make a boundary by drawing the arc of a circle from the Delaware river round to the Maryland border, at a radius of 12 m. from the New Castle courthouse. The survey of this line, and the accurate settlement of the e. and w. line, was a task not easy of accomplishment. Commissioners attempted it in 1732, 39, and 50; but could not agree, and the case still pended in the chancery court, until Lord Hardwicke gave a decision 1750, May 15, which was made the basis, ten years later, of a final adjudication signed by the contesting parties 1760, July 4. Commissioners and surveyors now spent three years, from 1760, Nov., measuring the base and tangent lines separating Delaware from Maryland. To complete the work, Mason and Dixon, as more skilled mathematicians and surveyors, were brought from England. They began 1763, Dec., and had completed all but the last 36 m. of the e. and w. line bounding Pennsylvania on the s. when Indian troubles caused suspension of the work, and Mason and Dixon, returning to Philadelphia, were discharged, 1767, Dec. 26. At the end of every fifth mile a stone, brought from England, was placed, engraved on one side with the arms of Lord Baltimore, on the other with those of the Penns; while the intermediate miles were marked by smaller stones bearing M on one side and P on the other. The remaining 30 m. were run by Col. Alexander McLean of Pennsylvania and Joseph Neville of Virginia 1782, Nov., and verified and marked 1784. The surveys of the line were revised 1849, and found substantially correct.

MA'SON BEE: various species of bee which build their nests of agglutinated earth or grains of sand (see BEE). The nest is attached to walls or stones, sometimes to beams or logs, in sunny places. The interior contains about a dozen cells, in each of which is deposited an egg.

MASON CITY: Iowa, city, county-seat of Cerro Gordo county; on the Chicago, M. & St. P., the Chicago & N. W., the Iowa C., and the Chicago G. W. railroads; about 115 miles in direct line north by east of Des Moines. It was settled in 1855 and its present charter was granted in 1870. It is in an agricultural and stock-raising region, fire-clay and valuable sandstone quarries are in the vicinity. Its chief industrial interests are connected with the manufacturing of sash and doors, brick and tile, flour, and lime, and the quarrying of sandstone. It has a large foundry and considerable trade in live-stock and grain. The municipal government is vested in a mayor, who holds office two years, and a council. The waterworks are owned and operated by the city. Pop. (1910) 11,230.

MA'SONRY: art of construction in stone, brick, etc. The earliest existing examples are among the most magnificent specimens of the art. No nation has excelled the ancient Egyptians in stonework, whether we consider the size of the materials, or the unequalled exactness with which they are fitted together. The Egyptians did not use mortar in their important structures such as the pyramids, the joints being all carefully polished and fitted. Cyclopean M., of which remains exist in many parts of Greece and Italy, also exhibits stones of great size and with carefully adjusted joints (fig. 1). The walls of Mycenæ are among the earliest examples: these are built with huge irregular blocks, the spaces between being filled with smaller stones. The Etruscan specimens are more carefully executed; the stones are not squared, but they are all carefully fitted together. In

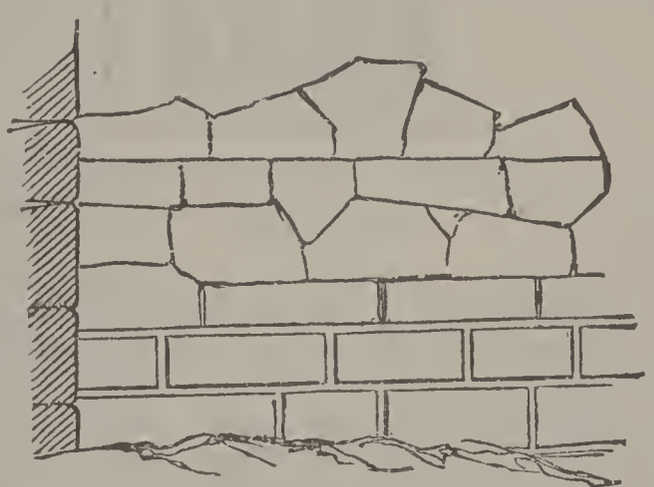


Fig. 1.—Wall in Peloponnesus.

some cases, the beds or horizontal joints are made level, and the upright joints left unsquared. No mortar is used in cyclopean masonry.

The M. of the Greeks and Romans very closely resembled that of the present day: *Rubble-work* (*opus incertum*), in which the stones are not regularly coursed; *Coursed-work*, where the joints are all level, and the stones of equal height; *Ashlar*, resembling the latter, but built with larger stones all carefully dressed on the joints. Many of the Roman buildings in the Eastern Empire were constructed with blocks of enormous size, as at Baalbec, where some of the stones are 60 ft. in length. Ashlar-work is frequently used for the exterior surface of walls, the inside being 'backed up' with rubble-work. This kind of work is sufficient for ordinary purposes; but where great strength is required, the whole thickness must be built with solid blocks. Ashlar-work is generally bedded in fine mortar, with one inch of oil-putty on the outer edge.

The early mediæval M. was of bad construction; in fact, little better than common rubble, with an occasional use of herring-bone work. The Normans improved on this kind of work, but their M. also was so bad, that most of the towers built by them either fell or had to

be taken down. The fall of the tower of Chichester Cathedral, a few years ago, was occasioned by defective Norman masonry. The art gradually improved with the advance of Gothic architecture, and ashlar was reintroduced for all important works. The ashlar-work so constantly used in Renaissance buildings has lately given place to a more picturesque style of masonry called hammer-dressed and squared work—the money saved on this cheaper work being applied with good effect in improving the appearance of the doors, windows, and other prominent features of the buildings.

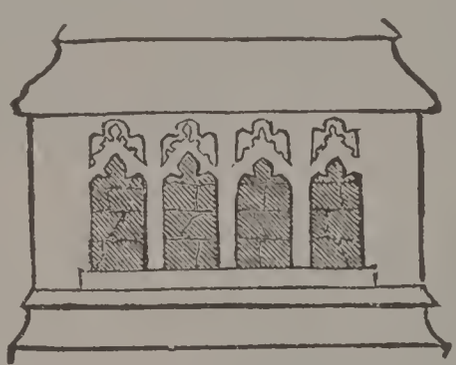


Fig. 2.—Flint Panelling from Fakenham Church, Norfolk England.

There is one very simple rule, too little attended to in modern M.—viz., that all stones, at least when stratified, should be laid on their *natural bed*, for if set on edge, they are sure to scale off and decay under the influence of the weather. Special materials sometimes produce special kinds of work; thus, where large flints abound, the walls are often faced with these, split to form a clean face and good joints, and arranged in bands or panels between stone-work or brick-work (fig. 2). Where granite is the usual building material, ashlar-work is frequent, large blocks being more easily obtained and dressed than smaller ones. Where rag-stone only can be got, it is frequently neatly used in a similar manner to the flint above described.

MA'SONS, FREE: ancient fraternity, formerly of operative masons; now existing as a secret society with moral, social, and benevolent objects. The mason brotherhoods of the middle ages were organized incorporations, not substantially different in their nature from the other guilds, governed by rules of their own, and recruited from a body of apprentices who had undergone a period of probationary servitude. Legend and imagination have traced back the origin of freemasonry to the old Roman Empire, the Pharaohs, the Temple of Solomon, or even the times of the Tower of Babel and of the Ark of Noah. It is claimed that recent explorations in Egypt accord with the tradition that the order was in existence when the pyramids were built. The masonic craft probably became organized about the same time, and from the same set of causes, as other incorporated crafts; but a variety of circumstances combined to give it importance and influence beyond the rest Men

skilled in the hewing and setting of stones were naturally prized in an eminently church-building age. Their vocation necessarily involved travelling from place to place for employment. Wherever a great church or cathedral was built, the local masons had to be reinforced by a large accession of craftsmen from other parts; and the masons from neighboring towns and districts flocked to the spot, and took part in the work, living in a camp of huts reared beside the building on which they were engaged. A master presided over the whole, and every tenth man was a warden having surveillance of the rest. A mason, therefore, after going through his apprenticeship and probations, could not settle down, like another craftsman, among his neighbors and acquaintances, but must travel from place to place as employment called him; hence it became desirable or necessary to devise means by which a person once a member of the fraternity might be universally accepted as such, without requiring, wherever he went, to give fresh evidence of his skill, or having to undergo a renewed examination on his qualifications. In order to accomplish this end, and to enable a mason travelling to his work to claim the hospitality of his brother-masons on his way, a system of symbols was devised, in which every mason was initiated, and which he was bound to keep secret. This symbolism, invented for convenience of intercourse between members of the same craft, is probably the foundation for the popular notion that the masonic brethren were in possession of secrets of vital importance, the knowledge of which had been from generation to generation confined to their own order. It has been supposed that the possession of the masonic secrets enabled the masons to design the great cathedrals of the 13th and 14th c., whereas it is now certain that during the purest ages of Gothic architecture, both in France and in England, the architects were not members of the masonic fraternity at all, but either laymen of skill and taste, uninitiated in the mysteries of mason-craft, or oftener bishops and abbots. The masons who worked from the architect's design were, at the same time, not the mere human machines that modern workmen too generally are, but men who, in carrying out an idea imparted to them, could stamp an individuality of their own on every stone. Architecture was then a progressive art, and the architect of every great church or cathedral had made himself acquainted with the works of his predecessors, and profited by experience, adopting their beauties, and shunning their defects. The nature of the advance which architecture was then making has been compared by Mr. Fergusson to the advance with which we are familiar in the present day in ship-building and other useful arts. 'Neither to the masons nor to their employers, nor to the Abbé Suger, Maurice de Sully, Robert de Susarches, nor Fulbert de Chartres, is the whole merit to be ascribed, but to all classes of the French community carrying on steadily a combined

movement toward a well-defined end.' In Germany, however, the masons of the 14th c., who had attained wonderful skill in carving and in constructing arches, overstepping their original functions, took to a great extent the office of architect into their own hands; and it is undeniable that the churches designed by German masons, though rich in the most exquisite workmanship, are not comparable in the higher elements of beauty, to the works of non-masonic architects.

The epithet 'Free' was applied to the craft of masons in consequence of their being exempted by several papal bulls from the laws which regulated common laborers, and exonerated from various burdens thrown on the working-classes at large, both in England and on the continent. Like all the other guilds, the masons were bound by their rules to the performance of specific religious duties; but a craft, one of whose principal functions was church-building, was naturally under the more especial protection of the clergy. Yet a considerable time before the Reformation, we find the jealousy of the church excited from time to time by the masonic brethren, partly in consequence of their assuming other functions besides those of builders. In England, an act, passed in the minority of Henry VI., at the instigation of Henry of Beaufort, Cardinal of Winchester, prohibited the masons from holding their wonted chapters and assemblies. But this act was never enforced; and Henry VI., on coming of age, himself countenanced the masons, and was a member of the fraternity. Henry VII. became their grand master in England.

The history of freemasonry has been overlaid with interesting legend, partly from an exaggerated estimate of its importance in the development of architecture, and partly from a natural tendency to find a connection between mediæval masonry and the institution that passes under the same name in the present day. Modern (or so-called 'speculative') freemasonry is an innocent or, it may well be granted, benevolent mystification unconnected either with the building craft or with architecture. In its form as now known it is of British origin, and dates from the 17th c. According to the peculiar phraseology of the masonic brethren, it is founded in the 'practice of moral and social virtue;' its distinguishing characteristic is charity, in its most extended sense; and brotherly love, relief, and truth are inculcated by its precepts. Its real f unders were Elias Ashmole and some of his literary friends, who amused themselves by devising a set of symbols, borrowed in part from the Knights Templars, between whom and the old masons an intimate relation is said to have subsisted, and in part from the Rosicrucians (q.v.). These symbols, which have since been adopted as the distinguishing badge of the brotherhood of 'Free and Accepted Masons,' include the sun, the moon, the compasses, square, and triangle. A number of so-called degrees or grades of masonry with fantastic names were established

and conferred on the members.* Charles II. and William III. were masons; and a visible connection with operative masonry was kept up by the appointment of Sir Christopher Wren to the office of Grand Master. The 'Lodges' of Scotland profess to trace their origin to the foreign masons who came to Scotland 1150 to build Kilwinning Abbey; those of England go still further back, to an assemblage of masons held by St. Alban, the protomartyr, at York, 926; and the mother-lodges of York and Kilwinning were, with insignificant exceptions, the parents of all the several lodges erected in different parts of Great Britain. Toward the close of the 18th c., it was in some quarters made a charge against freemasonry, that under its symbolism was concealed a dangerous conspiracy against all government and religion. This accusation, groundless as regards British freemasonry, produced so little effect, that, in an act passed 1799 for suppression of secret societies, an exception was made in favor of freemasons. On the continent of Europe political intriguers may sometimes have availed themselves of the secrecy afforded by freemasonry to further their schemes. In 1703 the English masons of the lodge of St. Paul opened the order to the membership of others than operative masons and builders; this was at the completion of St. Paul's Cathedral, London. This important change from the ancient to the present form was developed in 1717, when a Grand Lodge was formed in London, with power to grant charters to other lodges. Under its sanction, the first edition of the constitutions of the fraternity was published. The Grand Lodge was for a length of time on an unfriendly footing with the lodge of York, in consequence of having introduced various innovations not approved by the older lodge, and of having granted charters within the district which York claimed as its own. In 1742 the Duke of Cumberland was elected Grand Master of the Grand Lodge; and on his death, George IV., then Prince of Wales, succeeded to the office, which he held till he was appointed regent, when, it being considered unsuitable that he should longer exercise any personal superintendence, he took the title Grand Patron. In 1813, an understanding and a union were brought about between the two rival lodges by their respective Grand Masters, the Dukes of Kent and Sussex. The fraternity has since been managed by the 'United Grand Lodge of Ancient Free and Accepted Masons of England,' consisting of the Grand Master, with his Deputy, Grand Wardens, and other officers, the provincial Grand Masters, and the Masters and Wardens of all regular lodges, with a certain number of stewards annually elected, who meet four times a year for the dispatch of business, besides which

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*The three principal grades are apprentice, fellow-craft, and master-mason; there being peculiar ceremonies at the making of each; and it is only on attaining to the degree of master-mason, that a brother enjoys the full benefits and privileges of the craft.

there is an annual masonic festival, at which every mason is entitled to attend. The Grand Lodge of England has at present more than a thousand lodges under its protection.

In Scotland, the masons, when they were a real company of artificers, were, like other handicrafts, governed by wardens of districts appointed by the king. In 1598, a re-organization of the mason lodges was effected under William Schaw, principal warden and chief master of masons, who in the following year confirmed the three "heid lodges" in their ancient order of priority—Edinburgh first, Kilwinning second, and Stirling third. In 1736, the operative element in mason lodges having become absorbed in speculative masonry, the Grand Lodge of Scotland was instituted by the representatives of 34 lodges, by whom also William St. Clair of Roslin was elected Grand Master, on account of his ancestors' alleged ancient connection with the mason craft, as patrons and protectors. Priority was assigned to the lodges according to the antiquity of their written records. The Lodge of Edinburgh (Mary's Chapel) was placed first, and Kilwinning second. The Lodge of Kilwinning did not formally object to this till 1744, when it withdrew from the Grand Lodge and resumed its independence. On relinquishing this position 1807, it was re-admitted into the Grand Lodge by the title of Mother Kilwinning, with precedence over the other lodges, and the Provincial Grand Mastership of Ayrshire rendered hereditary in its Master.

Modern freemasonry spread from Britain to the continent, to America, and to India. It was introduced into France 1725, Russia 1731, and Germany 1740. Grand Lodges now exist in France, Belgium, Netherlands, Denmark, Sweden and Norway, Prussia, Saxony, Hamburg, Switzerland, Italy, Portugal, Greece, Canada, Nova Scotia, and New Brunswick, in Central and S. America, and in British Columbia. Lodges in connection with European grand bodies exist in India, Africa, China, Polynesia, Turkey, Palestine, W. Indies, Australia, and New Zealand.

The statistics, 1905, show a total Grand Lodge membership in the United States and British America of 1,062,425, the gain over the previous year being more than 58,000.

These Grand Lodges are in full affiliation with the English Grand Lodge, of which the Duke of Connaught is Grand Master, and the Grand Lodges of Ireland, Scotland, Cuba, Peru, South Australia, New South Wales, Victoria, and also with the masons of Germany and Austria. They are not in affiliation and do not correspond with the masons under the jurisdiction of the Grand Orient of France; they, however, affiliate with and recognize masons under the jurisdiction of the Supreme Council.

The Ancient Accepted Scottish Rite Masons, or Su-

preme Council, of Sovereign Grand Inspectors-General of the Thirty-third and Last Degree has fraternal relations with the Supreme Councils of Great Britain and Ireland, Canada, Italy, Egypt, Cuba, Argentina, Australia, New Zealand, Mexico, Belgium, Germany, and Switzerland, and other Grand Orients. It has jurisdiction over subordinate Consistories of Sublime Princes of the Royal Secret.

The Royal Arch Masons have 44 grand chapters, each representing a State or Territory (except Pennsylvania and Virginia), and the number of enrolled subordinate chapters is 2,600, exclusive of 24 subordinate chapters in the Territories of the United States, the Sandwich Islands, Porto Rico, Chile, and the Chinese Empire, which are under the immediate jurisdiction of the General Grand Chapter.

The Knights Templars have 45 grand commanderies in the United States and Territories, each representing individual States or Territories (except that Massachusetts and Rhode Island are combined). Commanderies subordinate to Grand Commanderies, 1,129, with a membership of 153,935. Commanderies subordinate to Grand Encampment, 12; membership, 1,603; total number of commanderies, 1,141; total membership, 155,538. The orders conferred in a Commandery of Knights Templar are Red Cross, Knight Templar, and Knight of Malta. A mason to obtain these orders must be a Master Mason and Royal Arch Mason in good standing, and a member of both Lodge and Chapter.

The Ancient Arabic Order of the Nobles of the Mystic Shrine is not a regular masonic body, but its membership is composed strictly of masons who have reached the 32d degree, A. A. S. Rite (18th degree in England), or Knights Templar in good standing. There are 98 temples in the United States, and a total membership of about 100,000.

MA'SON WASP (*Odynerus murarius*): species of wasp, which makes its nest by boring a cylindrical hole in hard sand, or even in the plaster of walls, on which an exudation from the mouth seems to act so as to soften it sufficiently. At the orifice, an outer tube is constructed, sometimes two or three inches in length, of pellets formed in the excavation. In the interior, an egg is deposited, with a number of little caterpillars ready for food of the larva when hatched.

MASO'RA: see MASSORA.

MASQUE, n. *mâsk* [F. *masque*—from It. *mas'chera*, a mask]: a cover for the face; a piece of sculpture representing some grotesque form; a dramatic performance formerly so called, in which the company is masked. MASQUERADE, n. *măs'kėr-ād'*, a nocturnal meeting of persons wearing masks, at which they amuse themselves with dancing, etc.; disguise; a Spanish equestrian diversion: V. to put into disguise; to go in disguise. MAS'QUERAD'ING, imp.: N. the assembling in masks. MAS'QUERAD'ED, pp. MAS'QUERA'DER, n. *-dėr*, one who wears a mask; one disguised. *Note.*—There is no proper reason for making a distinction between MASK and MASQUE; the former may be called the Eng. and the latter the F. spelling. Any difference in their use is sufficiently indicated in the text. 'An entertainment' is the primary sense of MASK as found in OE. authors, the use of the 'visor' at such entertainments having given rise to the sense, 'a cover or disguise for the face.'

MASQUE: species of dramatic performance, much in vogue in England toward the close of the 16th and the beginning of the 17th c. It was, in fact, the favorite form of private theatricals. The masque appears to have originated in the practice of introducing, in any solemn or festive processions, men wearing masks, who represented either imaginary or allegorical personages. At first, it was simply an 'acted pageant,' as in the well-known progresses of Queen Elizabeth; but gradually it expanded into a regular dramatic entertainment, and in the hands of men like Fletcher and Ben Jonson attained high literary beauty. Jonson's masques were represented at court, and were greatly relished. The taste for this kind of amusement, however, died away in the reign of Charles I.; nevertheless, to the time of that monarch belongs the finest masque ever written—the *Comus* of Milton (1634). See Mason's *Life of Milton* (I. 542, et seq.).

MASQUERADE', or MASKED BALL: festive meeting, usually nocturnal, in which the host and guests assume fictitious characters, and disguise themselves more or less for the occasion. The public *mummeries* of former times, Easter plays, Festivals of Fools, etc., frequent in most parts of Europe, but various in different countries, probably suggested the idea of the masquerade, which, however, was not open to all, according to the well-understood rules of these ancient amusements, but was limited to some select class, or to those who paid a certain sum for admission. Catharine de' Medici introduced the regular masquerade at the French court. It found its way to England in the reign of Henry VIII., but did not reach any of the courts of Germany till the end of the 17th c. The *bal costumé* is a very modified and much less objectionable form of the masquerade. During the Carnival, public masquerades are held in the theatres and dancing-saloons of Paris.

MASS, n. *măs* [F. *masse*, a mass—from L. *massa*, that which adheres together like dough: It. *massa*, a lump: Gr. *massō*, I knead]: a body or lump; a large quantity; a heap; the quantity of matter in any body: V. to form into a mass; to form into a collective body; to assemble. MASS'ING, imp. MASSED, pp. *măst*. MASSIVE, a. *măs'ĭv*, weighty; ponderous; bulkly and heavy. MASS'IVELY, ad. *-lĭ*. MASSIVENESS, n. *măs'ĭv-nĕs*, state of being massive; great weight with bulk. MASSY, a. *măs'ĭ*, weighty; heavy; ponderous; massive. MASS-MEETING, a large public meeting for political discussion.—SYN. of mass, n.': bulk; body; quantity; congeries; assemblage; multitude; the general; the mob; populace.

MASS, n. *măs* [F. *messe;* It. *messa;* Sp. *misa*, the sacrifice of the Mass—from L. *missa*, for *missĭō*, dismission, in the phrase, *Ītĕ, missa est*, 'Go, you are dismissed,' being the words employed in dismissing the catechumens when the celebration of the Eucharist began]: celebration of the Eucharist in the Rom. Cath. Chh.; the sacrifice of the Mass, or the celebration of the Lord's Supper in the Rom. Cath. Chh. MASS-BOOK, the Rom. Cath. Missal.

MASS: in the Roman Catholic Church, the Eucharistic service which, as in the Greek and other oriental churches, is held to be a real though unbloody sacrifice in which Christ is the victim; in substance the same with his sacrifice on the cross, and instituted as the means of applying its merits, through all ages, unto men. The doctrine of the M., as understood by Rom. Catholics presupposes the Real Presence in the Eucharist; though the latter doctrine does not necessarily involve the notion of a sacrifice. Whatever may have been the primitive character of the Eucharistic rite, the earliest Christian history, whether in the Acts of the Apostles, the canonical Epistles, or the writings of the most ancient of the Fathers, shows the existence of the rite of the Lord's Supper, which is still recognized in most Christian communities as the chief and most solemn part of public worship. According to Rom. Cath. belief, this rite is partly a sacrifice, partly a communion and participation thereof by the faithful; and of the names by which it is called in the works of the early Fathers, some—e. g., *agape*, (love-feast), and *hagia synaxis* (holy communion), refer to the latter, while others—e. g., *thysia, prosphore, hiereion* (sacrifice, oblation, victim offered)—indicate the former signification. The etymology of the name now in use is somewhat obscure, but it is commonly referred to the proclamation by the deacon at the close of the general service *dismissing* the congregation with these words—'Ite, *missa est*' ('Go, the assembly is dismissed'). By primitive use, the communion of the faithful appears to have formed part of the Eucharistic service; but afterward it came to pass that only the officiating priest communicated. In the

ancient writers, a distinction is made between the 'mass of the catechumens' and the 'mass of the faithful;' the former including all the preparatory prayers, the latter all that directly regards the consecration of the elements and the communion, at which solemn mystery the 'discipline of the secret (See SECRET, DISCIPLINE OF THE) forbade the presence of the catechumens. With the cessation of this discipline, the distinction of names has ceased, but the distinction of parts is still preserved, the M. of the catechumens comprising all the first part of the M. as far as the 'preface.' The M. is now in general denominated according to the solemnity of the accompanying ceremonial, a 'Low Mass,' a 'Chanted Mass,' or a 'High Mass.' In Low M. a single priest simply *reads* the service, attended by one or more acolytes or clerks. The chanted M. differs only in this, that a certain portion of the service is *chanted*, instead of *read* by the priest. In High M. the service is chanted in part by the priest, in part by the deacon and subdeacon, by whom, as well as by several ministers of inferior rank, the priest is assisted. In all these, however, the service, as regards the form of prayer, is the same. It consists of (1) an introductory prayer composed of Ps. xlii, in Eng. Bible xliii, with the 'general confession;' (2), the Introit, followed by the thrice-repeated petition, 'Lord, have mercy,' 'Christ, have mercy,' and the hymn, 'Glory to God on high;' (3), the collect, or public and joint prayers of priest and people, followed by a lesson either from the Epistles or some book of the Old Testament, and by the Gradual (q.v.); (4), the gospel, commonly followed by the Nicene Creed; (5), the OFFERTORY (q.v.), after the reading of which come the preparatory offering of the bread and wine, and the washing of the priest's hands, in token of purity of heart, and the 'secret,' a prayer read in a low voice by the priest; (6), the preface, concluding with the trisagion, or 'thrice holy'—at which point, by the primitive use, the catechumens and penitents retired from the church; (7), the 'canon,' which is always the same, and which contains all the prayers connected with the consecration, the elevation, the breaking, and the communion of the Host and of the chalice, as also the commemorations both of the living and of the dead; (8), the 'communion,' which is a short scriptural prayer, usually appropriate to the particular festival; (9), the 'post-communion,' which, like the collect, was a joint prayer of priest and people, and is read or sung aloud; (10), the dismissal with the benediction, and, finally as a lesson, John i. Great part of the above prayers are fixed, and form what is called the 'ordo' or 'ordinary' of the M. The rest, called the 'proper of the M.,' differs for different occasions; some masses being 'of the season,' as of Lent, Advent, Holy Week, 'Quatuor Tempora' (ember days), etc.; others, of 'Mysteries,' as

of the Nativity, the Circumcision, the Resurrection; others, again, of saints, as of an Apostle, a Martyr, or a Confessor; others, again, 'notive,' as 'of the Passion,' 'of the Dead,' 'for Peace,' etc. In all these various classes, as well as in the individual masses under each, the 'proper' portions of the M. differ according to the occasion, and in some of them certain portions of the 'ordinary,' as the 'Glory to God on high,' the 'Gradual,' or the 'Nicene Creed,' are omitted. On one day in the year, Good Friday, is celebrated what is called the 'M. of the Presanctified,' in which no consecration takes place, but in which the priest communicates of the Host which was consecrated on the preceding day. This usage is found also in the Greek Church, not alone on Good Friday, but on every day during Lent, except Saturday and Sunday. In the celebration of M. the priest wears peculiar vestments, five in number—two of linen, called 'amice' and 'alb;' and three of silk or precious stuffs, called 'maniple,' 'stole,' and 'chasuble,' the alb being girt with a cincture of flaxen or silken cord. The color of these vestments varies with the occasion, five colors being employed on different occasions—white, red, green, purple or violet, and black; and they are often richly embroidered with silk or thread of the precious metals, and occasionally with precious stones. The priest is required to celebrate the M. fasting, and, unless by special dispensation, is permitted to offer it only once in the day, except on Christmas-day, when three masses may be celebrated.

In the Greek and Oriental churches, the Eucharistic service differs in the order of its parts, in the wording of most of its prayers, and in its accompanying ceremonial, from the M. of the Latin Church (see LITURGY); but the only differences of importance as bearing upon doctrine, are their use of leavened bread instead of unleavened; their more frequent celebration of the 'M. of the Presanctified,' above referred to; the Latin use of private masses, in which the priest alone communicates; and, in general, the much more frequent celebration of the M. in the Latin Church. The sacred vestments, too, of the Greek and Eastern rites differ notably from those of the Latin; and in some of the former—e. g., the Armenian—a veil is drawn before the altar during that part of the service in which the consecration takes place, which is withdrawn only at the time of the communion. The service sometimes used on shipboard, and improperly called *Missa Sicca* (Dry Mass), consists simply of the reading of the prayers of the M., but without any consecration of the elements. It was resorted to with a view to avoiding the danger of spilling the sacred elements, owing to the unsteady motion of the ship. It is sometimes also called *Missa Nautica* (Ship Mass).—See LORD'S SUPPER, THE.

MASSACHUSETTS, *măs-a-chū'sets*: state; one of the 13 original states in the American Union; ranking (1900) 1st in cotton, woolen, and worsted goods, and in cod and mackerel fisheries; 3d in value of domestic exports; 4th in value of manufactures; 4th in silk goods; 6th in iron and steel; 9th in agricultural implements; known familiarly as the Old Bay State.

Location and Area.—M. is in lat. 41° 14′—42° 53′ n., long. 69° 53′—73° 32′ w.; bounded n. by Vt. and N. H., e. by the Atlantic Ocean, s. by the Atlantic Ocean, R. I., and Conn., w. by R. I. and N. Y.; extreme length e. to w. 180 m.; extreme breadth 113 m.; 8,315 sq. m. (5,321,600 acres); highest elevation 3,505 ft.; cap. Boston.

Topography.—The extensive coast line is indented with numerous bays, harbors, and sounds, the largest of which are Buzzard's Bay, Vineyard Sound, Edgartown and Nantucket Harbors, Cape Cod Bay, Wellfleet Bay, Plymouth Harbor, Duxbury Bay, Massachusetts Bay, (comprising Boston, Lynn, Nahant, Marblehead, Salem, and Beverly Harbors), Gloucester Bay, Sandy Bay, and Annisquam Harbor. The chief coast islands, of which there are several hundred, are Martha's Vineyard, Nantucket, and several in the Elizabeth group. The Connecticut river which bisects the w. part of the state, and the Merrimac in the n.e. part, are the only rivers navigable for any considerable distance; but the Housatonic, Hoosic, Miller's, Nashua, Blackstone, Concord, Taunton, Charles, and Mystic, are invaluable for their great water-power. The chief lakes are Wenham and Quinsigamond, the latter a favorite place for college regattas. The surface varies from flat and sandy plains in the s.e. to the ridges of the Green Mountains in the w., the valley of the Conn. river having the richest soil in the state. The w. part contains two separate mountain ridges, the Taghkanic or Taconic, near and parallel with the N. Y. line, and the Hoosick or Hoosac further e. The former ridge has two notable peaks (highest in the state), Saddle Mountain or Greylock, in Adams, 3,505 ft., and Mt. Washington or Mt. Everett, in the s.e. corner of the state, 2,624 ft. The Hoosac ridge reaches a height of 1,200–1,600 ft., and is pierced by a famous railroad tunnel 5 m. in length. Near the w. bank of the Connecticut river are the isolated peaks, Mt. Tom, 1,214 ft. high, and Sugar Loaf. Near the e. bank is Mt. Holyoke, 910 ft.; and in Princeton tp., Worcester co., is Mt. Wachusett, 2,018 ft.

Climate.—The climate is variable, and generally cool, with e. winds prevailing; annual mean temperature 45° in the n.w., 50° in the s. e.; spring 43°, summer 71°, autumn, 51°, winter 21°; July is the hottest month in Boston, mean 73°; and Jan. the coldest, mean 28°. As the mercury in Boston sometimes falls to 10° below zero in winter, and rises to 100° in summer, the city has a range between extremes of 110°. Average rain-fall in Boston 45 inches, in state 55, equably distributed through the seasons.

Geology.—M. is composed chiefly of metamorphic rocks.


MASSACHUSETTS
Area in Square Miles, 8,315.
Number of Counties, 14.
Population, 2,805,000.
Capital of State, Boston.
SCALE OF MILES
0 5 10 15 20 25 30
VERMONT
NEW HAMPSHIRE
CONNECTICUT
RHODE ISLAND
ATLANTIC OCEAN
Massachusetts Bay
Cape Cod Bay
Buzzards Bay
Nantucket Sound
BOSTON
Worcester
Springfield
Holyoke
Mt. Tom
HARTFORD
PROVIDENCE
Fall River
New Bedford
Brockton
Lowell
Lawrence
Somerville
Cambridge
New Haven
Waterbury
Meriden
Litchfield
Williamantic
Plainfield
Norwich
New London
Stonington
Pt. Judith
Newport
Danbury
Ansonia
Housatonic R.
Connecticut R.
Thames R.
Taunton R.
Blackstone R.
Deerfield R.
Westfield R.
Chicopee R.
Nashua R.
Merrimac R.
Concord R.
Charles R.
Neponset R.
Weymouth Fore R.
Weymouth Back R.
Nantasket
Cohasset
Hingham
Quincy
Braintree
Milton
Dedham
Norwood
Walpole
Foxboro
Norfolk
Attleboro
Taunton
Middleboro
Lakeville
Rochester
Marion
Mattapoisett
Wareham
Buzzards Bay
Sandwich
Barnstable
Dennis
Brewster
Orleans
Harwich
Chatham
Monomoy I.
Monomoy Pt.
Pleasant L.
Eastham
Wellfleet
S. Wellfleet
Provincetown
N. Truro
Truro
Cape Cod
Marshfield Hills
Marshfield
Duxbury
S. Duxbury
Plymouth
Manomet
Chiltonville
Halifax
Kingston
Bridgewater
Easton
Mansfield
Norton
Attleboro
N. Attleboro
Seekonk
Somerset
Swansea
Warren
Bristol
Warwick
Cranston
Central Falls
Woonsocket
Putnam
Rockville
Manchester
Bristol
New Britain
Waterbury
Meriden
Danbury
Ansonia
New Haven
Norwich
New London
Stonington
Pt. Judith
Newport
Block I.
Martha's Vineyard
Elizabeth Is.
Vineyard Haven
Cottage City
Edgartown
Chilmark
Gay Head
Falmouth
Woods Hole
Hyannis
Hyannisport
Centerville
Marstons Mills
Monument Beach
Cataumet
Mashpee
W. Falmouth
Quissett
Nantucket
Great Pt.
Longitude West 71°30′ from Greenwich
BORMAY ENG. CO., N.Y.

In the e. these are overspread with the sand and bowlders of the drift formation. Syenite and granite prevail along the coast, with numerous and noted quarries. Coarse conglomerates and argillaceous slates of a remote age, abound in the vicinity of Boston; gneiss, talcose and mica slates are found in broad belts running n. and s. from the e. portion of the state to the Housatonic river; and the Connecticut river valley discloses the triassic, or new red sandstone formation, with extensive and famous fossil footprints of birds and animals, some of great size. The conglomerates and argillaceous slates are connected with coal-bearing strata near the R. I. line, which in Bristol and Plymouth cos. contains beds of anthracite. Here is a region of altered Silurian sandstones and calcareous formations extending along the Housatonic river and thence to the Vt. border, which contains numerous beds of iron ore and glass sand of high value. Gold, silver, copper, and lead deposits have been discovered in various parts of the state, and a few of them, especially the gold, silver, and lead in Essex co., have been worked. The state has large tracts of valuable forest, and, by bounties, encourages the planting of timber trees in regions unfit for agriculture. Oak, ash, and hickory are plentiful in various parts; birch, maple, and beech predominate in the w., chestnuts in the central region, and hard and white pine and cedar in the s. e.

Zoology.—M. has but few wild animals remaining, and scarcely any large game birds. Rabbits, squirrels, and small game birds, great owls, fish hawks, gulls, brant, wild ducks, and some reptiles are plentiful; and the cod, mackerel, halibut, bass, and tautog are very prolific, well-known, and the source of several great industries.

Agriculture.—The agricultural pursuits of M. have always been outranked by the manufacturing industries. As compared with the great farming States of the West the agricultural output is insignificant. The chief products are milk, eggs, poultry, and garden produce, with cranberries in Barnstable county; tobacco in the Connecticut Valley; and general market produce in parts of Middlesex county. Altogether there are about 40,000 farms, comprising approximately 3,250,000 acres, of which, roughly, one-half is improved land. The total value of all farm property, including lands, buildings, and improvements, implements and machinery, and live stock is about $200,000,000. Vegetables, small fruits, flowers and plants, and dairy products are valuable. Corn, oats, rye, buckwheat, hay, and potatoes are also important crops in the State.

Manufactures.—There are about 35,000 manufacturing establishments in M., their total annual output being valued at more than $1,500,000,000. M. holds first place in the manufacture of boots and shoes; cotton, worsted, and woolen goods; fine writing paper; and rubber boots and shoes. It also takes high rank in the

manufacture of jewelry, metal ware, machinery of all kinds, clothing, cordage, wooden goods, rattan, and other furniture. Other important industries are slaughtering and meat packing; foundry and machine-shop products; printing and publishing; leather; paper and wood pulp; iron and steel; lumber; liquors; furniture. The fishing industry has, from earliest times, been an important element in the prosperity of the coast towns, but of later years it has declined rapidly.

Commerce and Transportation.—M. comprises one U. S. internal revenue district, with headquarters in Boston, and has 12 custom stations. Boston is, of course, the chief port of entry, and is extensively engaged in foreign commerce. Many lines of passenger and freight steamers ply between Boston and European ports, while the coastwise freight and passenger traffic to the e. and s. is important. The average annual imports aggregate about $110,000,000 and the exports about $100,000,000. The vessels entering and clearing the ports of Boston and Charlestown annually aggregate nearly 5,000,000,000 tons.

There are nearly 2,250 miles of railway, practically all of which is controlled by the Boston and Maine, the Boston and Albany (leased to the New York Central and Hudson River), and the New York, New Haven, and Hartford Railroads. M. also possesses a highly developed electric street railway system.

Finance and Banking.—The total assessed valuation of property, including both personal and realty, is about $5,000,000,000, while the bonded debt is about $80,000,000. There are considerably over 200 national banks, nearly 200 savings banks, about 50 trust companies, and about 130 co-operative banks.

Education.—M. is one of the great educational centres of the country, and is spending nearly $18,000,000 a year in maintaining its public schools, in which there are about 550,000 pupils enrolled, with about 15,000 teachers. There are both public and private normal schools, about 100 private secondary schools, co-educational colleges and universities, colleges and universities for men only, colleges and seminaries for women only, and schools of law, medicine, dentistry, theology, technology, and music.

Religion.—The strongest denomination is the Roman Catholic, others which are strongly represented being the Baptists (of different bodies); the Methodists (of different bodies); the Unitarians, and the Protestant Episcopalians.

Charitable and Penal Institutions.—The State institutions dealings with the defective classes include hospitals for the insane at Worcester, Taunton, Northampton, Danvers, and Westborough, and the Insane Asylum, so-called, at Medfield. Other institutions are the Massachusetts Hospital for Epileptics at Foxborough, a State Colony of the Insane, the Massachusetts School for the Feeble-minded at Waltham, the Hospital Cottages for

Children at Baldwinville, the Massachusetts Hospital for Dipsomaniacs and Inebriates at Foxborough, the Massachusetts Charitable Eye and Ear Infirmary at Boston, Homœopathic Hospital at Boston, the Massachusetts State Sanatorium at Rutland (for consumptives), the Perkins Institution and Massachusetts School for the Blind at South Boston, and the Soldiers' Home at Chelsea. There are special educational institutions for the deaf which include the American School for the Deaf at Hartford, Conn.; the Clarke School for the Deaf, Northampton; the Horace Mann School for the Deaf, Boston; the Sarah Fuller Home for Little Deaf Children, Medford; the New England Industrial School for Deaf Mutes, Beverly; and the Boston School for the Deaf. The penal and reformatory institutions include the Lyman School for Boys at Westborough; the State Industrial School for Girls at Lancaster, the State Prison at Boston (Charlestown District); the Massachusetts Reformatory at Concord; and the Reformatory Prison for Women at Sherborn. The State institutions for paupers include the State Hospital at Tewksbury and the State Farm at Bridgewater.

History.—According to Prof. Eben N. Horsford of Harvard Univ., the country extending from R. I. to the St. Lawrence was first seen by Bjarni Herjulfson A.D. 985; the Charles river was discovered by Leif Erikson 1000; the vicinity was explored by Leif's brother Thorwald 1003; and the first colony was established by Thorfinn Karlsefni 1007. The name of Vinland was given the region because of the abundance of wild grapes. Acting on the researches of Prof. Horsford, the American Geographical Soc. celebrated the discovery of the ancient city or town of Norumbega, at a memorial tower erected near the junction of Stony brook with Charles river, in Watertown, Mass., 1889, Nov. 21, and caused a tablet, crediting the Northmen with the discovery of the region, to be let into the tower. Prof. Horsford's interesting and well-studied theory has not found universal acceptance with historical scholars. In 1497 the Cabots visited the coast, and as they were in the employ of the English at the time, the crown claimed possession of the region on the ground that they had discovered it. Bartholomew Gosnold (q.v.) is credited with having been the first English settler in M. With 32 colonists he made his second voyage to America 1602, anchored in York Harbor, Me., May 14, and seeking a more suitable locality, entered M. Bay on the following day, and afterward planted his colony on an island which he named Elizabeth, in honor of the queen of England. The first purely religious movement toward M. was 1620, Sept. 6, when a company of 100 English Independents who, being persecuted by the established church, had fled to Holland in search of religious liberty, sailed from Plymouth, England, in the 180-ton ship *Mayflower* for a new home in America. The vessel reached Cape Cod Nov. 9, and after

a party had selected an advantageous spot for the colony, the settlers landed at the present Plymouth Dec. 21. Before leaving England they had secured valuable privileges from the Va. Co.; and soon after landing they made a treaty of friendship with Massasoit, chief of the Indians in that region. The first two years the colonists suffered severely from the weather and crop failures, but received considerable accessions, under a patent. In 1622 an expedition was sent from England to establish a plantation in M. Bay, and the new colonists, under the encouragement of the Plymouth party, settled at the present Plymouth. Unable to secure a separate and independent crown patent, the Plymouth colonists were forced by circumstances to become a law and state unto themselves. They framed laws and chose civil officers for their govt., and thus evolved a gov., council, and legislature. In 1628 John Endicott landed another expedition at Salem. This had been organized by an English company, which had obtained a grant of territory between the Atlantic and Pacific oceans, and extending 3 m. s. of Charles river and M. Bay and 3 m. n. of the highest water of the Merrimac river. Soon after Endicott's arrival a patent was obtained for the M. Bay Company, a corporation was established according to the charter, and the increased number of associates became a body politic, with a gov., dep. gov., and 18 assistants, who were to be elected annually. In 1629 the govt. of the company was transferred from London to New England; John Winthrop took charge of another expedition and was appointed gov.; a new emigration was fostered; and during 1629-30 there were more than 1,500 arrivals from England. About this period settlements were made at Charlestown, Boston, Watertown, Dorchester, Roxbury, Mystic, and Saugus. After Gov. Winthrop decided to remove his settlement from Charlestown to the trimountain peninsula (Boston) in order to secure better water, he bought the whole peninsula, excepting a tract of 6 acres, for £30, and the colonists engaged actively in founding the metropolis of the M. Bay colony. The first general court of the colony was held in Boston 1630.

The Plymouth and M. Bay colonies maintained amicable relations with each other, but each supported a separate and independent govt. for more than 60 years. Each had internal troubles which were controlled by local laws and officers; together they suffered from the Pequot Indian war 1636-7 and King Philip's war 1675-6; and together they were harassed with difficulties with the crown that originated in a belief in England that the colonies were seeking to make themselves independent. The colonists maintained themselves by thir own efforts, with no assistance from England; and when the crown attempted to annul the charter of the M. Bay colony and appointed a commission to govern the colony, the general court took steps to fortify Boston harbor and to raise and drill troops for the purpose of resisting, if neces-

sary, any interference with the civil and religious liberties of the people. Charles II., after his restoration, made demands on the colonists, which one portion strongly opposed and another was willing to yield rather than provoke further trouble. In 1664 royal commissioners reached Boston, charged with the duty of investigating the affairs of the colony, but were unable to fulfill their mission, and were recalled. The king reproved the colonists, and ordered the gov. and others to appear in London and answer for the opposition to his commissioners, but all refused to go. At the close of King Philip's disastrous and costly war, during which the colonists were left by England entirely to their own resources, another royal commissioner came over, Edward Randolph, and vainly endeavored to carry out the purposes of the previous commissioners. The king, further exasperated, then planned to bring all the New England colonies under the jurisdiction of a royal gov., and to annul the charter of the M. Bay colony. The right of jurisdiction over Me. and N. H. was denied M. by the privy council. M. retaliated by purchasing the title to Me. The colonists made fruitless efforts to effect a reconciliation with the king, conceding many important considerations in the interest of peace and loyalty. In 1684 the English high court of chancery gave judgment against the gov. and company of M., and declared their charter forfeited. The general court was abolished, and Joseph Dudley was appointed pres. He was superseded by Sir Edmund Andros (1686), who for more than two years maintained an arbitrary, vindictive, and tyrannical administration not only over all the New England colonies but over N. Y. and N. J. as well. On the receipt of news (1689, Apr.) that William of Orange had landed in England, the people of Boston, aided by sympathizing neighbors, rose in arms, arrested and imprisoned Andros and all his subordinates, recalled the general court, and chose the former dep. gov., Thomas Danforth, to be acting gov. An official notice of the proclamation of William and Mary in England was soon afterward received, and the new king was simultaneously proclaimed in the Plymouth and M. Bay colonies. In 1690 M. aided England in the intercolonial war between the possessions of England and France, and issued the first paper money seen in the colonies to pay the troops. Two years later the king granted a new charter by which the Plymouth and M. Bay colonies were consolidated into one govt., and appointed Sir William Phips, a native of New England who had commanded the M. forces in the intercolonial war, gov. of the consolidated colony. The witchcraft excitement occurred in Salem (q.v.) during Gov. Phips's administration. In 1703-4 and 1722-5 the province suffered severely from raids by French colonists in Canada and their Indian allies, and the disturbances were ended only by the almost complete extermination of the Indian tribes adjacent. During the war between France and

England 1744-48, M. contributed effectively to the expedition that captured Louisburg (1745), and to the movements for the conquest of Canada; and in the second war, 10 years later, was equally liberal with men and means in the interest of the crown.

About 1767, the home govt. began to devise measures of oppression, first in the shape of taxation, then in commercial restrictions, and afterward in the establishment of large bodies of royal troops on the soil of M. as a menace against opposition. Following early plans for securing more revenue from the colony, came the passage and repeal of the Stamp Act, the massacre in Boston 1770, the destruction of the cargo of tea 1773, the Port Bill 1774, the arming of the people, the seizure by the militia of the arsenal at Charlestown, the organization of the provincial congress in Concord, and the shedding of the first blood in the revolutionary war at Lexington and Concord 1775, Apr. 19.

In 1780 M. adopted her first constitution, which, though several times amended, is virtually the supreme law of the state to-day. In 1786 Daniel Shays (q.v.) incited the people in the w. part of the state to rebel against the authorities, and the insurrection was not suppressed without bloodshed. M. ratified the federal constitution 1788, Jan.; was opposed to the war with England 1812, but though her commerce suffered greatly by it, aided the govt. with large drafts of seamen for the navy; was represented in the Hartford Convention (q.v.) and furnished its presiding officer, George Cabot, 1814; and had its long-standing dispute with the 'district' of Maine (q.v.) settled by congress 1820, when the former district was admitted into the Union as a state. During the civil war M. constituted 159,165 men to the union army and navy, or 13,492 more than were called for by the federal govt. The losses included 3,749 killed in action, 9,086 died from wounds or disease, 5,866 never accounted for, and 15,645 discharged for disability contracted in service. The war expenditures of M. were $30,162,200.

Government.—The executive authority is vested by the constitution in a gov., and an executive council consisting of the gov., lieut.-gov. and 8 citizens representing so many divisions of the state, a secretary of the commonwealth, treasurer and receiver-general, auditor of accounts, and attorney-general, all elected annually; the legislative authority is vested in 'the general court,' comprising a senate of 40 members, and a house of representatives of 240 members, all elected annually, the judicial authority is vested in a supreme judicial, superior, probate, insolvency, municipal, police, and district courts. All judges are appointed by the gov. with the consent of the council, and hold office during good behavior. The supreme judicial court consists of a chief justice and 6 assoc. justices; superior court of a chief justice and 9 assoc. justices.

MASSACHUSETTS.

The successive govs. with their terms of service are as follows: *Plymouth Colony:* John Carver 1620-1; William Bradford 1621-33; Edward Winslow 1633-4; Thomas Prence 1634-5; William Bradford 1635-6; Edward Winslow 1636-7; William Bradford 1637-8 Thomas Prence 1638-9; William Bradford 1639-44; Edward Winslow 1644-5; William Bradford 1645-57; Thomas Prence 1657-73; Josiah Winslow 1673-81; Thomas Hinckley 1681-6; Sir Edmund Andros (gov.-gen.) 1686-9; Thomas Hinckley 1689-92; *Mass. 1st charter:* John Endicott (act'g) 1629-30; John Winthrop 1630-34; Thomas Dudley 1634-5; John Haynes 1635-6; Henry Vane 1636-7; John Winthrop 1637-40; Thomas Dudley 1640-41; Richard Bellingham 1641-2; John Winthrop 1642-4; John Endicott 1644-5; Thomas Dudley 1645-6; John Winthrop 1646-9; John Endicott 1649-50; Thomas Dudley 1650-51; John Endicott 1651-4; Richard Bellingham 1654-5; John Endicott 1655-65; Richard Bellingham 1665-73; John Leverett 1673-9; Simon Bradstreet 1679-84; Jos. Dudley (pres.) 1684-6; Sir Edmund Andros (gov.-gen.) 1686-9; Thomas Danforth (act'g) 1689-92; *Mass. 2d charter:* Sir William Phips 1692-4; William Stoughton (act'g) 1694-9; Richard Coote (Earl Bellomont) 1699-1700; William Stoughton (act'g) 1700-1; Council 1701-2; Joseph Dudley, 1702-15; Council, part 1715; Joseph Dudley, part 1715; William Tailer (act'g) 1715-6; Samuel Shute 1716 23; William Dummer (act'g) 1723-28; William Burnett, part 1728; William Dummer (act'g) 1728-30; William Tailer (act'g), part 1730; Jonathan Belcher 1730-41; William Shirley 1741-49; Spencer Phips (act'g) 1749-53; William Shirley 1753-56; Spencer Phips (act'g) 1756-7; Council, part 1757; Thomas Pownal 1757-60; Thomas Hutchinson (act'g), part 1760; Sir Francis Bernard 1760-69; Thomas Hutchinson (act'g), 1769-71; Thomas Hutchinson, 1771-74; Thomas Gage, part 1774; Prov. Congress, part 1774-5; Council, part 1775-80; *State:* John Hancock 1780-5; James Bowdoin 1785-7; John Hancock, part 1787-93; Samuel Adams (act'g), part 1793-4; Samuel Adams 1794-97; Increase Sumner, part 1797-99; Moses Gill (act'g) part 1799-1800; Caleb Strong 1800-07; James Sullivan, part 1807-8; Levi Lincoln (act'g), part 1808-9; Christopher Gore 1809-10; Elbridge Gerry 1810-12; Caleb Strong 1812-16; John Brooks 1816-23; William Eustis, part 1823-25; Marcus Morton (act'g), part 1825; Levi Lincoln 1825-34; John Davis, part 1834-5; Samuel T. Armstrong (act'g), part 1835-6; Edward Everett 1836-40; Marcus Morton 1840-1; John Davis 1841-43; Marcus Morton 1843-4; George N. Briggs 1844-51; George S. Boutwell 1851-53; John H. Clifford 1853-4; Emory Washburn 1854-5; Henry J. Gardner 1855-58; Nathaniel P. Banks 1858-61; John A. Andrew 1861-66; Alexander H. Bullock 1866-69; William Claflin 1869-72; William B. Washburn, part 1872-74; Thomas Talbot (act'g), part 1874; William Gaston 1874-76; Alexander H. Rice 1876-79; Thomas Talbot 1879-80;

John D. Long 1880-83; Benjamin F. Butler 1883-4; George D. Robinson 1884-87; Oliver Ames 1887-90; J. Q. A. Brackett 1890-91; William E. Russell 1891-93; Frederick T. Greenhalge, 1894-97; Roger Wolcott, 1897-1900; Winthrop M. Crane, 1900-02; John L. Bates, 1902-04, William L. Douglas, 1905-6; Curtis Guild Jr., 1906-8. Eben S. Draper, 1908-10; Eugene N. Foss, 1910—.

Politics.—State, congressional, and presidential elections on Tuesday after the first Monday in Nov. M. has 16 electoral votes. Her votes for pres. and vice-pres. have been as follows: 1789, George Washington and John Adams 10; 1792, George Washington and John Adams 16; 1796, John Adams 16 for pres., and Charles C. Pinckney 13, S. Johnson 2, and Oliver Ellsworth 1 for vice-pres.; 1800, John Adams and Charles C. Pinckney; 1804, Thomas Jefferson and George Chinton 19; 1808, Charles C. Pinckney and Rufus King; 1812, George Clinton 22 for pres., and Jared Ingersoll 20 and Elbridge Gerry 2 for vice-pres.; 1816, Rufus King and John E. Howard; 1820, James Monroe 15 for pres., and Richard Stockton 8 and Daniel D. Tompkins 7 for vice-pres.; 1824. John Quincy Adams and John C. Calhoun; 1828, John Quincy Adams and Richard Rush; 1832, Henry Clay and John Sergeant 14; 1836, Daniel Webster and Francis Granger; 1840, William Henry Harrison and John Tyler; 1844, Henry Clay and Theodore Frelinghuysen 12; 1848, Zachary Taylor and Millard Fillmore; 1852, Winfield Scott and William A. Graham 13; 1856, John C. Fremont and William L. Dayton; 1860, Abraham Lincoln and Hannibal Hamlin; 1864, Abraham Lincoln and Andrew Johnson 12; 1868, U. S. Grant and Schuyler Colfax; 1872. U. S. Grant and Henry Wilson 13; 1876, Rutherford B. Hayes and William A. Wheeler; 1880, James A. Garfield and Chester A. Arthur; 1884, James G. Blaine and John A. Logan 14; 1888, Benjamin Harrison and Levi P. Morton 14; 1892, Benjamin Harrison and Whitelaw Reid 15; 1896, William McKinley and Garret A. Hobart 15; 1900, William McKinley and Theodore Roosevelt 15; 1904, Theodore Roosevelt and Charles W. Fairbanks 16.

Population.—(1790) 378,787; (1800) 422,845; (1810) 472,040; (1820) 523,159; (1830) 610,408; (1840) 737,699; (1860) 1,231,066; (1870) 1,457,351; (1880) 1,783,085; (1890) 2,238,946; (1900) 2,805,346; (1910) 3,366,416.

MASSACHUSETTS AGRICULTURAL COLLEGE, at Amherst, Mass., a coeducational institution, chartered in 1863 and opened in 1867 by the State. The college farm is 400 acres in extent, about 100 acres of which are devoted to horticulture, and 290 acres to farming. The work is experimental on the part of the students. The regular course extends over four years, but special courses are given for women desiring to study dairying, market gardening, and some other subjects. Winter courses are provided for those unable to take the four years' work. The regular courses lead to the degrees of

B.S., M.S., and Ph.D. In 1905 the number of instructors was 24, and the students in attendance about 210. The library had about 26,600 volumes; the buildings and grounds were valued at $265,000 and the equipment at $115,000.

MASSACHUSETTS BAY: indentation on the e. coast of Mass. between Cape Cod and Cape Ann, 70 m. long, 25 m. wide, but including in its irregular form Plymouth Bay, Cape Cod Bay, and several others, with numerous small islands.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, THE, was founded in 1865, at the close of the Civil War. The undergraduate studies of the school are divided into 13 distinct courses, each of four years' duration, and leading to the degree of Bachelor of Science. The four-year courses are Civil Engineering, Mechanical Engineering, Mining Engineering, Metallurgy, Architecture, Chemistry, Electrical Engineering, Biology, Physics, General Studies, Chemical Engineering, Sanitary Engineering, Geology, and Naval Architecture. The Institute occupies at present eight buildings devoted exclusively to instruction. The most interesting aspect of the equipment is the extensive laboratories. In the 21 separate laboratories devoted to chemistry, there are, besides the larger general laboratories, smaller rooms for volumetric analysis, organic chemistry, air, water and food analysis, the analysis of oils and gases, the optical and the chemical examination of sugars and starches and the determination of molecular weights. There are also the industrial chemical laboratories, the engineering laboratories, the steam laboratory, and the new Lowell Laboratory of Electrical Engineering, which covers an area of 45,000 square feet, and embraces a laboratory for electrical measurements, photometer rooms, and a main power and testing floor 300 feet by 40 feet. The total number of its students in 1905 was 1,600, the total number of instructors 188.

MASSACRE, n. *măs'sa-ker* [F. *massacre*, slaughter; *massacrer*, to slaughter: OF. *macecricr*, a butcher—probably connected with L. *macellum*, a meat-market]: the indiscriminate and unnecessary slaughter of human beings; butchery: V. to put human beings to death without the forms of law, or on insufficient grounds; to slaughter indiscriminately; to butcher human beings. MAS'SACRING, imp. *sa-krĭng*. MAS'SACRED, pp. *-kerd*: ADJ. barbarously murdered.—SYN. of 'massacre, n.': slaughter; carnage; murder; destruction.

MASSAGE, n. *măs'săj* or *mă-sâzh':* remedial method, based on the use of a variety of mechanical processes, chiefly passive. The positive value of massage, especially in chronic cases, is proved by experience. Massage is defined as *motion with pressure*, communicated by the hands of an operator or *masseur* to the soft, yielding, fleshy parts of the invalid, in prescribed order and degree. At the present day the successful practice of massage is due in part to prevalence of a better knowledge of disease, and in part to improved modes of application. Massage is sometimes applied by means of mechanical power, in addition to that of the hands.

Some obvious therapeutic principles in massage are the following: Combined pressure with motion displaces and replaces—i.e., renews the nutritive fluids of the organism, thereby promoting both the assimilative and dissimilative processes essential for health. The use by the system of oxygen is much increased—more being taken up from the air by respiration; and the wasting ingredients are thereby changed to the forms required for dismissal. This last effect may be intensified to the desired degree. Massage displays a peculiar combined tonic and sedative effect upon the nervous system, inducing repose, dispelling fatigue, and inviting to renewed labor. Its employment is of great therapeutic value in many disorders of the nervous system, such as neuralgia, neurasthenia, chorea, etc., in dispelling the crippling after-effects of sprains and fractures, in muscular rheumatism, in writer's cramp, and in many other conditions. In combination with hydrotherapy it is one of the best means we possess of bringing back tone to exhausted and weakened nerves and muscles.

MASSAG'ETÆ: nomadic people, who inhabited the broad steppes on the n.e. of the Caspian Sea. n. of the river Araxes or Jaxartes. Herodotus says that they had a community of wives, that they devoured their aged people, and that they worshipped the sun, and offered horses to him. Cyrus is said to have lost his life in fighting against them, B.C. 530. Niebuhr and Böckh assigned them to the Mongolian, but Humboldt and others, to the Indo-Germanic or Aryan family.

MASSASAWGA, n. *măs-sa-saw'ga* [Indian name]: the prairie rattlesnake, found in some states westward from Ohio. It has large scutes on the head, and the rattle is much smaller than in other species.

MASSASOIT, *măs'sa-soyt:* Indian sachem, of the Pokanokets (or Wampanoags), within whose territory the Pilgrim colony at Plymouth began the settlement of New England (1620): d. 1660, about 80 years of age. He had been 'the greatest chief of the tribes between Narragansett Bay and the Piscataqua,' until a terrible pestilence, about 1618, cut down a numerous and powerful tribe of 30,000 to a few hundreds, leaving the territory, now s. Mass., at some distance about Plymouth, almost

uninhabited. Massasoit appeared to the Plymouth colonists first 1621, Mar. 22, with 60 warriors, and readily entered into a league of friendship, which lasted 50 years, until the old chief's younger son, Philip, became hostile (1671), and brought on 'King Philip's war' (1675-6). The residence of Massasoit was in what is now Warren, R. I., near a remarkable spring which still bears his name. Winslow and Hopkins, who visited him here from Plymouth, 1621, July, found his lodging a sty of the most wretched description; his bed a low platform of sticks and mats, one end of which he occupied with his wife and gave the other to his guests, while two other Indians crowded on, until stench, vermin, and mosquitoes drove the Englishmen out of doors. In the midst of summer abundance, with 40 lazy savages in attendance, Massasoit's guests had nothing to eat the first day, and on the second only their share of three small fishes set before the whole company. Winslow made a second visit to Massasoit 1623, Mar., upon a report that he was about to die, and, by energetic measures, nursing, cooking, and applying simple remedies, rescued him from his starved, filthy, and almost dying condition. Massasoit showed his gratitude by revealing a plot of the Indians scattered along the coast to destroy all the English, which, but for this discovery and the prompt killing by Miles Standish of the heads of it, would have blotted out the colony. The sons of Massasoit, Wamsutta and Metacomet obtained from the court at Plymouth, after their father's death, English names, Alexander and Philip. Alexander died within two years, and Philip, who succeeded, 1662, was killed 1676, Aug. 12, in the war that he had raised against the English.

MASSENA, *mā-sē'na:* N. Y., village, in Saint Lawrence county; on the Grasse river, and on the New York C. & H. R. and the Grand T. railroads; about 35 miles northeast of Ogdensburg. It was settled by people from Vermont, about 1802, and was incorporated as a village in 1886. It is situated in a rich agricultural region, in which the chief products are hay, potatoes, dairy products, and apples. Massena Springs, just outside the village limits, is one with the village in commercial and industrial interests, and is a famous resort on account of its medicinal springs. Great opportunities for manufacturing are afforded by the plant of the Saint Lawrence River Power Company, which has a capacity of 40,000 horse-power, and which can easily be increased. This power has been secured by diverting a small portion of the waters of the Saint Lawrence river through a canal, three miles long, into turbines, which have direct connection with electric generators, and thence into the Grasse river.

The canal starts at the head of the Long Sault rapids in the Saint Lawrence, and is 200 feet wide and 18 feet in depth. Owing to the peculiar formation of the country

here, the point at the head of the rapids is 45 feet higher than the point where the canal enters the Grasse river, which is a tributary of the Saint Lawrence. The Grasse acts as a tail race, carrying the water back into the Saint Lawrence. Two bridges span the canal. By using the Grasse river and the canal there is now a passage wholly within the United States for steamers around the unnavigable rapids. The power plant at Massena is second only to Niagara as a centralized power supply station. The chief industrial establishments are reduction works, which employ 300 men; veneering works, employing 100; mineral filler works, 30 employees; sash and door works, 20 employees. Other manufactories are under consideration. There are seven churches, two banks, a high school, and public schools. Massena is the business centre for a population of 60,000. Pop. 2,951.

MASSÉNA, *mâ-sā-nâ*, ANDRÈ: Duke of Rivoli, Prince of Essling, and a marshal of France; 1758, May 6—1817, May 4: b. Nice; of humble (said to be Jewish) parentage. In his youth he served as cabin-boy in a small vessel; and from 1775 was 14 years in an Italian regiment in the pay of France, but left it because his plebeian birth precluded him from promotion. Early in the French Revolution, he joined a battalion of volunteers 1792, and soon rose to high military rank. 1793, Apr., he was colonel; in Dec. general of division. He greatly distinguished himself in the campaigns in upper Italy, winning the battle of Loano and the great victory at Rivoli. After Jourdan's defeat at Stockach, 1799, Mar. 25, the chief command of the army in Switzerland devolved on him in circumstances of great difficulty, but he kept his ground against the Archduke Charles, and finally, by his victory over Suwarroff and the Russians at Zurich, 1799, Sept. 25—taking 200 guns and 5,000 prisoners—freed France from danger of invasion. After the battle of Marengo, Bonaparte gave him command of the army of Italy. In 1804, he was made a marshal of the empire. In 1805, he again commanded in Italy, first holding in check Archduke Charles, and then utterly defeating him at Caldiero Oct. 30; and subsequently he signalized himself in the terrible contest at Essling for the village of Aspern (q.v.). In 1810, he was intrusted with the chief command in Spain, and compelled the British and their allies to fall back to Lisbon; but being unable to make any impression on Wellington's strong position at Torres Vedras, he resigned his command, ascribing his failure to the disobedience of his three generals, Ney, Reynier, and Junot. He offered his services, however, again, when Napoleon was preparing for the Russian campaign, but was only intrusted with the command in Provence, and in this position he remained till the Restoration, when he gave in his adhesion to the Bourbons, and was made a peer. On Napoleon's return from Elba, he invited Masséna to follow him, but re-

ceived no response. After the second Restoration, Masséna retired into private life. Masséna was the greatest soldier and general of Napoleon's marshals: on the battle-field he was swift, unwavering, full of the resources of genius. In private life he showed lack of education, moroseness, and the Italian indolence, and withal was as extortionate as a Roman pretor. His master called him a robber, and is said to have offered him a present of 1,000,000 francs if he would give up peculation.

MASSENET, *mâs-nā,* JULES FRÉDÉRIC EMILE: French composer: b. Montaud, near St. Etienne, France, 1842, May 12. He studied at the Paris Conservatoire, in which in 1878 he became professor of composition. His first important work was the opera *Don César de Bazan* (1872), which was followed by *Les Erinnyes* (1873); an oratorio *Marie Madeleine* (1873); and an oratorio *Eve,* produced in 1875. Later works of his are: The opera *Le Roi de Lahore;* the cantata *Narcisse; La Vierge* (1879); *Hérodiade,* a religious opera (1881); *Manon Lescaut,* an opera (1884); *Le Cid* (1885); *Esclarmonde* (1889); *Werther* (1892); *Thaïs* (1894); *Sappho.* Massenet's earlier works, such as *Marie Madeleine,* are still among his best. The promise contained in them has not been fulfilled in his later productions, in many of which genuine musical feeling is sacrificed to the tricks that secure popularity.

MASSETER, n. *măs-sē'tėr* [Gr. *masētēr,* one that chews—from *massāŏmai,* I chew]: a short, thick muscle at the posterior part of the cheek, which raises the lower jaw. MASSETERIC, a. *măs'sĕ-tĕr'ĭk,* applied to an artery, a vein, or a nerve connected with the masseter muscle.

MASSEY, *măs'ĭ,* GERALD: English socialist poet, journalist, and lecturer: b. near Tring, Hertfordshire, of poor, and illiterate parents, 1828, May 29; d. 1907, Oct. 29. With very scant instruction, working in a silk mill at 8 years of age, and later at straw-plaiting, he read whatever books he could get, and knew the Bible, *Robinson Crusoe,* and the *Pilgrim's Progress,* when he went to London to become an errand boy. He had already begun to write verses for provincial journals, and about 1846 made a volume of *Poems and Chansons.* The French revolution of 1848 greatly roused him, and 1849, Apr., with some fellow-workmen, he started a cheap ultra-radical weekly journal, the *Spirit of Freedom.* The Rev. Charles Kingsley encouraged and aided him: his poems gained entrance to London journals, and drew attention. Massey became a spiritualist, and lectured extensively in Great Britain, and 1873 in the United States. From 1863 he had a civil list pension. Besides several volumes of earnest and stirring verse he wrote on Shakespeare's Sonnets. His published works are: *The Ballad of Babe Christabel, and other Poems* (1853); *Craigcrook Castle* (1856); *Robert Burns, and other Lyrics* (1859); *Voices*

of Freedom and Lyrics of Love (1859); *Havelock's March, and other Poems* (1861); *Shakespeare's Sonnets never before Interpreted* (1866); *A Tale of Eternity, and other Poems* (1870); *Concerning Spiritualism* (1872); *A Book of the Beginnings* (1882); *The Natural Genesis* (1883); *My Lyrical Life*, a collection of poems (1889). For some years he lectured at home and in the United States and Australia on spiritualism and various social and socialistic subjects.

MASSICOT, n. *măs'ĭ-kŏt*, or MASTICOT, n. *măs'ti-kŏt* [F. *massicot*]: protoxide of lead, occurring in shapeless masses, of yellow color, brittle, with earthy fracture; the dross that forms on melted lead exposed to a current of air, and roasted till it acquires a uniform yellow color.

MASSIE, *măs'sē*, NATHANIEL: 1763, Dec. 28—1813, Nov. 13: western pioneer and soldier: b. Goochland co., Va. Served in the army of the Revolution; laid out on his own land the town of Chillicothe, O.; engaged in Indian wars of the northwest, and became general of Ohio militia; served repeatedly in the state legislature.

MASSIL'IA. See MARSEILLE.

MASSILLON, *măs'ĭl-on:* city, in Stark co., Ohio; on the Tuscarawas river, the Ohio canal, and on the Wheeling & L. E., the Pennsylvania, and the Cleveland, L. & W. railroads; about 100 m. in direct line n.e. of Columbus and 8 m. w. of Canton. Massillon was established in 1825, and in 1853 was incorporated as a village; the city charter was granted in 1868.

It is situated in the Tuscarawas valley, noted for its large bituminous coal fields and for its excellent farm lands. In the vicinity of the city are quarries of white sandstone. Some of the industrial establishments are foundries, rolling-mills, machine-shops, bridge works, potteries, glass-works, steel tubing, furnaces, flour-mills, and creameries. In addition to the manufactures of the city there is a large trade in coal, sandstone, grain, and live-stock. The State Hospital and Asylum for the Insane is in Massillon. The city has a number of fine buildings, chief among them are the churches and schools. The government is administered under the charter of 1868, its first charter, and is vested in a mayor, who holds office two years, and a council. The board of education is chosen by popular vote; the boards of health and equalization are elected by the council. Other administrative officials are appointed by the board subject to the approval of the council. Pop. (1890) 10,092; (1900) 11,944; (1910) 13,879.

MASSILLON, *mâ-sēl-yōng'* or *mâs-sē-yōng'*, JEAN BAPTISTE: distinguished pulpit orator: 1663, June 24—1742, Sept. 28; by Hyéres, France. His father, a notary, designed the boy for his own profession; and only after repeated and persistent efforts, Massillon obtained his father's permission to enter the congregation of the

Oratory 1681. While he was engaged in teaching theology in one of the houses of the congregation in the diocese of Meaux, he made his first essay in the pulpit at Vienne. His funeral oration on Villars, the Archbishop of Vienne, was eminently successful, and led to his being called by the superiors of the Oratory to Paris, where he first had the opportunity of hearing Bourdaloue, whose style and manner had great influence in forming his taste. Like Bourdaloue, he avoided the declamatory manner and theatrical action then popular in the French pulpit; but the earnest impressiveness of his look and voice more than supplied the vigor and energy which other speakers sought from these adventitious aids. His course of ecclesiastical conferences delivered in the seminary of St. Magloire, Paris, established his reputation. The criticism of Louis XIV., after his course of Advent sermons at Versailles 1699, that 'when he heard other great preachers, he felt satisfied with them, but when he heard Massillon he felt dissatisfied with himself,' well characterizes the eloquence of this great Christian orator, who, more than any of his contemporaries, was able to lay bare the secret springs of human action, and to use the feelings and the passions of his audience as arms against themselves. He was again appointed to preach the Lent at Versailles 1704; but though the king was again equally warm in his admiration of the preacher, Massillon was never afterward invited to preach in the presence of this monarch; yet his funeral oration on the Prince de Conti, 1709, was one of the greatest triumphs of his oratory. Indeed, Massillon was too honest to gain the favor of the court by flattery; while his ethical perceptions and his mental balance were too refined to permit his descent into the cheap and noisy fierceness of denunciation which often gains favor with the populace as zeal against vice. Soon after the death of Louis XIV., Massillon,. 1717, was named bishop of Clermont, and in the same year was appointed to preach before the young king, Louis XV., for which occasion he composed his celebrated *Petit Carême*—a series of ten sermons. It was not till 1719 that he was consecrated bishop of Clermont, in which year also he was elected a member of the Academy; and 1723 he preached the funeral oration of the Duchess of Orleans, his last public discourse in Paris. From this time for nearly a score of years he lived almost entirely for his diocese, where his great charity, gentleness, and pastoral fidelity gained him the affections of all. Among his works, his masterpieces are usually considered to be, beside the *Petit Carême,* his sermons on the Prodigal Son, on Death, for Christmas day, and for the 4th Sunday in Advent. His works, mainly sermons and similar compositions, were collected, 12 vols., by his nephew, and published 1745-6—later editions are those of Beaucè (4 vols. 1817), Mequignon (15 vols. 1818), and Chalandre (3 vols. 1847).

MASSINGER, *măs'ĕn-jĕr*, PHILIP: English dramatist: 1584—1640, Mar. 16; b. (it is supposed) at or near Wilton, seat of the earls of Pembroke, of which family his father was probably a retainer. Of his boyish days and studies, nothing is known; from his plays, we are, however, certain that he was a classical scholar. He entered St. Albans' Hall, Oxford, as a commoner 1602, and left the university suddenly without a degree, on the occasion, it is surmised, of his father's death. After leaving Oxford his career cannot be clearly traced. He came to London, and wrote for the stage, sometimes on his own account, frequently—as was the fashion of the time—in conjunction with others. He produced many plays, the dates of which are obscure. He seems to have lived in straitened circumstances, and to have been of a melancholy turn of mind. He was found dead in his bed, and was buried in the churchyard of St. Saviour's, by the hands of the actors. In the parish register stands the pathetic entry: 'March 20, 1639-1640, buried Philip Massinger, a stranger.' There has been controversy as to his religious belief: no decisive proof has been found, but the tone of several of his plays shows deep sympathy with the highest ideals of the Roman Catholic faith—and this at a time when that faith was in utmost popular disfavor in London.

Taken as a whole, Massinger's plays are not very impressive, except to a thoughtful reader. In development of plot Massinger is counted next to Shakespeare; but he gives his strength to delineating one ruling passion, while most of his men and women seem left in dim outline. The plays have striking merits in detached passages. He was of grave and serious mood, and his reflective passages often rise into a rich, elaborate music. His finest writing is in *The Virgin Martyr*, but his best plays are *The City Madam*, and the *New Way to Pay Old Debts*—the last of which has even yet some hold on the stage. Gifford's edition of Massinger (1805) is admirable; more recent is Cunningham's (1870).

MASSON, *măs'on*, DAVID: Scottish critic and biographer: b. Aberdeen 1822, Dec. 2; d. Edinburgh 1907, Oct. 7. H. was educated at Marischal College there and Edinburgh University, and was in 1852 appointed to succeed Clough in the chair of English language and literature at University College, London. He was editor of *Macmillan's Magazine* 1859-68, and was professor of rhetoric and English literature in the University of Edinburgh 1865-95. He was best known for his elaborate and comprehensive study of Milton's life and times (6 vols. 1858-80)—a work valuable alike as a contribution to English history and to the history of English literature. Other works by him are: *British Novelists and Their Styles* (1859); *Recent British Philosophy* (1865); *Drummond of Hawthornden* (1873); *The Three Devils—Luther's, Milton's, and Goethe's* (1874). He also pub-

lished the Cambridge edition of Milton's poems with introductions, notes, and an essay on Milton's English (1877); *De Quincey* in *English Men of Letters* series (1878); an edition of De Quincey's works (14 vols. 1889-91); and *Edinburgh Sketches and Memories* (1892). In 1893 he was appointed Historiographer-Royal for Scotland.

MASSON, Frédéric: French historian: b. 1847. He was librarian in the archives of the foreign office, and after the overthrow of the Empire became secretary to Prince Napoleon, and was entrusted with the arrangement of the prince's papers and collections. He is known as the author of nearly 20 volumes in a still incomplete series of works on Napoleon I. His method is anecdotic, and he has based his statements on original documents—correspondence, account and note books, and the like, many of which he himself owns in his large collection of Napoleonic material. Among the titles of his studies are: *Napoleon at Home; Napoleon in Campaign; War Adventures; Napoleon's Cavaliers.* In 1903 he was elected to the Académie Française to succeed Gaston Paris.

MASSORAH, or Masorah, n. *măs'ō-râ* [Heb.—from *masar*, to hand down (i.e., to posterity); or possibly from *asar*, to bind, to fix within limits]: Hebrew critical work on the verbal text of the Old Testament by several rabbins of the 8th and 9th c. Mas'soret'ic, a. *-rĕt'ĭk*, or Mas'soret'ical, a. *-ĭ-kăl*, pertaining to the Massorah or its authors. Massorite, n. *măs'ō-rīt*, one of the writers of the Massorah.—The *Massorah*, chiefly a collection of critical notes on the text of the Old Testament, its divisions, accents, vowels, grammatical forms, letters, etc., was evidently necessary for accurate preservation of the sacred documents, as, according to the early mode of Shemitic writing, only the consonants, and these without any stop or break, were written; a proceeding which, in the course of time, must naturally have produced a vast number of variants, or rather different ways of reading and interpreting the same letters, by dividing them into different words with different vowels and accents. The origin of the Massorah, fixing an immutable reading upon each verse, word, and letter, and ending the exercise of unbounded individual fancy—which, for homiletical purposes alone, was henceforth free to take its own views—is shrouded in mystery. The first traces of it are found in certain Halachistic works treating of the synagogue rolls of the Pentateuch, and the mode of writing them. (See Halacha.) Some of the earliest works on the subject have survived in their titles only, e.g., *The Book of the Crowns, The Book of the Sounds*, etc., attributed to the Soferim, or Masters of the Mishna (q.v.). There can hardly be a doubt that the Massorah, like the Halacha and Haggada (q.v.) was the work, not of one age or century, but of many ages and centuries; as, indeed, we find in ancient authorities

mention made of different systems of accentuation used in Tiberias, Babylon (Assyria), and Palestine. It was in Tiberias first that the Massorah was committed to writing between the 6th and 9th c. after Christ. Monographs, memorial verses, finally, glosses on the margins of the text, seem to have been the earliest forms of the written Massorah, which gradually expanded into one of the most elaborate and minute systems, laid down in the 'Great Massorah' (about the 11th c.), whence an extract was made known under the name of the 'Small Massorah.' A further distinction is made between Massorah *textualis* and *finalis*, the former containing all the marginal notes; the latter, larger annotations, which, for lack of space, had to be placed at the end of the paragraph. The final arrangement of the Massorah, printed first in Bomberg's Rabbinical Bible (Ven. 1525), is due to Jacob ben Chajim of Tunis, and to Felix Pratensis. The language of the Massorah is Chaldee, and besides the difficulty of this idiom, the obscure abbreviations, contractions, symbolical signs, etc., with which the work abounds, render its study exceedingly difficult. Nor are all its dicta of equal value; they are not only sometimes utterly superfluous, but even erroneous. Of its 'countings,' we may adduce that it enumerates in the Pentateuch 18 greater and 43 smaller portions, 1,534 verses, 63,467 words, 70,-100 letters, etc.—a calculation to a certain degree at variance with the Talmud.—An explanation of the Massorah is found in Elijah Levita's (q.v.) *Masoreth Hammesoreth* (trans. into German by Semler, Halle, 1772), and Buxtorf's *Tiberias* (1620), a work abounding with exceedingly curious information on the text of the Old Testament.

MASSOWAH, *mâs'sō-wâ*, or MESOWAH, or MASAUA: islet and town on the w. coast of the Red Sea, between the sea and frontier of Abyssinia, 15° 30′ n. lat., 39° 30′ e. long. It was given by Turkey to Egypt 1866, and was retained by Egypt with the rest of the Red Sea shores, when the Egyptian Soudan was given up 1884 In 1885 it was annexed by Italy, which holds it as a military and commercial station. The island is of coral, the soil formed partly from the rock, partly from sand and broken shells. It is only about a mile and a quarter in circumference, and is about 200 yards from the mainland. It is almost wholly occupied by the town, and contains a population of about 8,000, mostly Arabs. The Abyssinian coast is very destitute of harbors, and Massowah is of great importance as a seat of commerce, having large trade by sea with Bombay and with the Arabian coast, particularly with Jiddah and Yembo; and large trade by caravans with Cairo on the one hand, and with Gondar and all interior Abyssinia on the other. Caravans start at all seasons for Cairo and for Gondar; but most numerously in January at the end of the rains, and in June before the swelling of the waters. Wheat,

rice, maize, durra, salt, tobacco, gunpowder, sugar, cotton and silk goods, scarlet cloth, glass wares, arms and hardwares are among principal imports from the more distant parts of the world. From Abyssinia and the coasts of the Red Sea, Massowah receives and exports ivory, rhinoceros horns, wax, ostrich-feathers, tortoise-shell, myrrh, senna, pearls, etc. Massowah has all the worst characteristics of an oriental town. Its streets are mere lanes, and excessively dirty. Pop. about 8,000.

MASSYS', QUINTIN. See MATSYS.

MAST, n. *mâst* [Icel. *mastr;* Ger. Dut. *mast;* It. *masto,* the mast of a ship: OF. *mast;* F. *mât*]: one of the large upright timbers or poles which support the rigging of a ship. MAST'ED, a. having masts. MAS'TER, n. *-tėr,* a vessel having masts, used only with specification of the number, as a three-master.

MAST, n. *mâst* [Dut. *mesten,* to feed, to fatten: Ger. *mast,* the fattening of animals; *masten,* to fatten—*lit.,* edible fruit]: the fruit of oaks or beech-trees used for fattening hogs. MAST'FUL, a. *-fûl,* abounding in the fruit of the oak, beech, or chestnut.

MAST: upright or nearly upright spar, resting on the keelson (q.v.) of a ship, and rising through the decks to a considerable height, for the purpose of sustaining the yards on which the sails are spread to the wind. It is usually in joints or lengths, one above the other, the lowest and strongest being the *mast* proper, distinguished by its position as the fore, main, or mizzen mast. Above this rise successively the *top-mast,* the *top-gallant-mast,* the *royal-mast,* and—though very rarely used—the *sky-scraper.* The full height of all the masts together, in a first-rate ship of war, was about 250 ft. As, when a strong wind is blowing, the pressure upon the canvas carried by a mast amounts to many tons, the mast itself must be of great strength. In some modern vessels, hollow iron masts are used, with great success, as being much lighter than those of wood; but the majority are of Norway fir of the best quality. In small vessels the mast is made of one tree; but it is considered stronger when 'a made mast,' that is, when constructed of several pieces riveted together, and strengthened by iron hoops. The mast is sustained, when fixed, by the shrouds, as supports on each side, by the stay (q.v.) in front, and the backstays behind.

Iron and Steel Masts.—As far back as 1838, the City of Dublin Steam-packet Company had a steamer with hollow iron masts, the masts acting also as ventilating funnels for the cabins. From that time, iron has been frequently employed for lower masts, in sailing-ships as well as in steamers. The plan has usually been to make them of plates bent to the proper curvature, jointed by internal strips, and strengthened by an internal cross flange of plates secured by angle-irons; but

sometimes the plates are lapped. The plates vary from $\frac{3}{8}$ to $\frac{5}{8}$ in. in thickness. Grantham (*Iron-shipbuilding*) states that iron masts are 'lighter and stronger than timber masts; and when compared with the built-up masts of large vessels, are rather less expensive. For vessels of the same tonnage, the difference of weight is nearly two to three in favor of iron.'

Iron is used for yards as well as masts. An iron yard was made 1847 for the Australian clipper-ship *Schomberg*, 112 ft. long, and varying in diameter from 14 to 28 in.; it weighed $7\frac{1}{2}$ tons. It was calculated that a timber yard of the same size would weigh $12\frac{1}{2}$ tons. Iron masts have since been employed in many ships, made of three vertical ranges of plates bent to the required curvature, with butt joints, and riveted to three T-irons which cover the joints on the inside.

Since the use of steel in shipbuilding has become recognized, its use for masts has engaged attention: steel plates can now be made almost as easily as plates of iron; and it becomes a question of increased efficiency against increased cost as to which metal shall be adopted. Steel being a stronger metal than iron, masts of equal strength would weigh less if of steel than of iron. The hitherto not altogether unfounded distrust of steel in the present state of its manufacture, has hindered its rapid adoption. Great recent improvements in the manufacture of steel have largely removed the distrust of it, and its use for the various purposes of shipbuilding has enormously increased.

MASTER, n. *mâs'tėr* [OF. *maistre*—from L. *magistrum*, a master or chief: It. *maestro;* F. *maître*, a master]: a man who has rule or government over others; a lord; a ruler; a chief; the head of a household; a director; an owner; a possessor, with power of using; one very skilful in anything; one uncontrolled; a teacher or instructor; an employer; the commander of a merchant ship; officer in a ship of war; title of address to a young gentleman; title of dignity in the universities, as *Master* of Arts: V. to subdue; to conquer; to bring under control; to overcome; to excel in anything. MAS'TERING, imp. MASTERED, pp. *măs'tėrd.* MAS'TERFUL, a. *-tėr-fûl*, imperious; employing violence. MAS'TERLY, a. *-lĭ*, done with the skill of a master; most excellent: AD. with the skill of a master. MAS'TERY, n. *-ĭ*, rule; superiority; victory; eminent skill. MAS'TERSHIP, n. the office of a master, as of a college, etc.; dominion; rule; headship; in *OE.*, skill; knowledge. MASTER-BUILDER, the chief builder. MASTER-HAND, the hand of a man eminently skilful. MASTER-JOINTS, in *geol.*, a term applied to the large planes of division which pass through rock-masses, and which run regularly parallel for considerable distances, the *smaller joints* traversing the rocks in all directions—among quarrymen the former are called *backs*, and the latter *cutters*. MASTER-KEY, a key that opens

many locks. MASTER-MIND, a strong ruling or superior mind. MASTER-PASSION, a predominant passion. MASTER-PIECE, a capital or excellent performance; anything done or made with superior excellence; chief excellence. MASTER-SINGERS (see MINNE-SINGERS). MASTER-STROKE, an act or performance which excels in ability and skill. MASTER-WORK, the work or performance that excels all others. TO BE MASTER OF ONE'S SELF, to have entire self-control; not to be governed by passion. *Note.*—MASTER, as a prefix, is placed before the Christian name and surname of a man, and is then contracted into Mr., and pronounced *mĭs'tėr*, used as a title of courtesy and respect, theoretically inferior to *esquire;* but of late years used frequently as a substitute for, or even as preferred to, *esquire.* MASTER, written in full, and pronounced *măs'tėr*, is placed before the names of boys and youths as a mark of courtesy. The eldest son of a baron in the Scotch peerage is usually known by the title 'the Master of ——,' prefixed to his father's title of peerage. SYN. of 'master, n.': leader; adept; governor; proprietor; manager; commander; captain; teacher; tutor; instructor; preceptor;—of 'mastery': skill; dominion; pre-eminence; dexterity; power; command; supremacy.

MASTER, in the United States Navy: line-officer next below a lieutenant. His duties are important, usually including those of officer of the deck, and those of ordnance officer in charge of the battery, small arms, and magazine: also he occasionally acts as navigating officer or sailing-master. Formerly the last was his regular duty, whence his official name; but now the navigating of the ship is usually committed to the line-officer who ranks third on board.

In the merchant navy, the master of a vessel, usually, by courtesy, denominated the captain, is the officer commanding her. His duties comprise the maintenance of discipline, the sailing of the ship, the charge of her cargo, and many other mercantile functions. His responsibilities to the ship's owners are settled by distinct agreement, applicable to the special case. Toward the public, however, many statutes determine his responsibility.

MASTERDOM, n. *mâs'tėr-dŏm* [*master*, and *dom*]: in *OE.*, the state of a master; dominion; rule; chief authority.

MASTER IN CHANCERY: officer of a court to whom were referred all complicated suits, usually those involving the examination of long accounts; or upon whom certain duties in the course of an action were imposed, such as to take testimony or to sell property. The master exercised an almost independent jurisdiction in carrying out these references. When cases were referred to him for determination, his powers were those of a judge, and judgment was entered directly on his decision. In other cases the master completed the duty

delegated to him by sending a report stating the result of his inquiries to the court which appointed him; on this report a decree was made, based on his decision and investigation. Parties might appeal to the court from this report by filing exceptions or objections to it. When a cause had been referred to a master it could not be withdrawn from him without an order from the court, and this would be made only on rare occasions, such as the incapacity of the master, on account of illness, to attend to the business of the case. The office of master has been abolished in most of the states, but still exists in the United States courts. The duties of a master are now performed usually by a referee.

MASTER OF ARTS (M.A. or A.M., *artium magister*): an academical honor conferred by universities of the United States, Great Britain and other countries, upon students after a course of study and a previous examination in the chief branches of a liberal education, particularly philosophy, philology, mathematics, physics, and history. The word *magister,* connected with a qualifying phrase, was used among the Romans as a title of honor; but its present meaning must be traced to the time of the establishment of the oldest universities. Regularly organized faculties were not then known as they now exist in the universities. The whole circle of academic activity was limited to the seven liberal arts (see ART); and they who received public honors on the completion of their course of studies, for their diligence and knowledge, and had already received the degree of *baccalaureus* (bachelor), were called *magistri artium* (masters of the liberal arts). In American and English universities this degree follows that of bachelor. The degree of master of arts is inferior to that of doctor of letters (D.LITT.). In the German universities the title was formerly conferred, but has been superseded by that of doctor of philosophy (PH.D.), which practically corresponds to the degree of M.A. in other universities. This title is an indispensable preliminary to the attainment of the position of *docent* in the German universities, that is, one who has obtained the right to deliver academical lectures.

MASTER OF THE ROLLS: third in rank of the judges of the supreme court of judicature in England, next after the lord chancellor and the lord chief justice: he is one of the lords of appeal. Formerly the principal clerk of the chancery, he had charge of the records, including the register of grants, writs, and patents. Gradually he came to have judicial powers, and ultimately was the chief judge in chancery, and next the lord chancellor. Meanwhile, his original function of keeping the records passed from him, but was restored 1838, with extensive powers. The master of the rolls has no longer the privilege of being eligible for a seat in the house of commons.

MASTER AND SERVANT, in Law: employer and employed in the relation constituted by a contract to requite and to render service. In common language the terms are applied only to the relation known as domestic service; but they are capable of application, and are applied in law, to a great variety of departments in which bodily labor is hired. As the relation is constituted by a contract, it is plain that the servant's free consent is requisite. Being a mere contract, it may, like other contracts, be broken at will, subject only to the usual consequence, that the party in the wrong is liable to pay damages for the breach.

A servant is a person who by contract, is subject to the authority or control of another person in trade, business or occupation. In England servants were divided into three classes, menial servants or domestics, apprentices, agricultural laborers and agents. In the United States no such distinction exists between menial servants and other servants; servants of all kinds stand upon the same legal footing and in most cases the word servant, is synonymous with the word employee.

This relation between master and servant can arise only out of a contract express or implied between the master on the one hand and the servant on the other. As in all cases of contract, the contracting parties must be capable of making a valid contract, that is, neither must be under any legal disability; married women, infants, idiots, or lunatics can not enter into a contract for services, because in the eyes of the law they are incapable of making contracts, and all agreements made with persons who are thus disqualified are either absolutely void or are binding only on the one party at the option of the incapacitated party. In England an infant might make a contract of hiring and service that would bind him, if the contract were beneficial to him; but in the United States, it is necessary that both parties shall be of full age and not otherwise disqualified to make a valid contract.

The contract may be either oral or in writing except when the term of service is for a period longer than one year: then by statute in most of the states the contract is wholly void unless in writing. Generally where service is rendered by one party and accepted by another, the law presumes a contract of hiring, and an obligation to pay for the services arises on the part of the person accepting them. A distinction, however, is sometimes made between cases in which the services are rendered to strangers and those in which they are given to near relations. In most of the states no obligation to pay will be presumed between parent and child. A special contract must be proved to entitle the child to a recovery. A servant must have the requisite skill and capacity to perform the services which he undertakes, and is bound to obey the lawful orders of his master that are within the scope of his engagement; but he may not be dis-

charged for refusing to perform work not comprehended in his agreement.

A master is not bound to furnish medical aid or medicines to his servant, even if the illness be contracted by the servant in the course of his work or by an accident in the discharge of his duty. If, however, the master of his own volition secures medical attendance, he will be personally liable for the physician's bill, and it has been held that he may not deduct the charges from the wages of the servant. The master is bound to take proper care of his servant and not to expose him to any danger: he is under a legal obligation to use reasonable and ordinary care in providing the servant with safe and suitable machinery and implements for the performance of his work. The law does not deem the master an insurer of the servant's safety and freedom from danger in such cases, but obliges him to use such care and precaution as a man of reasonable prudence would do. If he does not use this required degree of care, and if the servant, not knowing of the defect in the materials furnished to him, is injured while using them, the master may be sued and damages may be recovered for the injuries. If the master does use sufficient care in providing materials, the servant is presumed to take on himself the ordinary risks incident to the business and the materials used, and he has no right of action against the master for injuries received by reason of any unknown defect or unforeseen danger or because he does not possess sufficient skill properly to use the appliances furnished him. If the servant is employed to do work involving peculiar danger or extraordinary risks, which he cannot be presumed to know or foresee, he must be informed about them or his master will be chargeable with negligence. If the servant knows of any defect in the machinery and continues in the service without objection after such knowledge, he is guilty of contributory negligence, and the master will not be liable if he sustains injuries: but if the servant is persuaded to remain, on the master's promise to amend the defect, he may recover if he is afterward injured. The master is bound to use reasonable care in procuring competent fellow-servants; if he does not, and the servant is injured by reason of some fault of a fellow-servant, the master will be chargeable with negligence, and liable for damages; if the master uses the proper amount of care in this respect, the servant is deemed to assume the risks of injuries from the acts of co-servants in the same common employment and cannot recover against the master. To constitute a fellow-servant, the servant must be under the same master, in the same common employment, and the servants must be of different grades. As to third parties, it is not essential to constitute the relation of master and servant, that there should be any contract between the parties or that any compensation should be expected by the party rendering the services; it is sufficient if the act is done by one party for another, with the knowledge

of the person sought to be charged as master or with his assent, express or implied, even though he has not requested the act to be done. As a general rule the master is responsible to third parties for the wrongful acts committed by his servant within the scope of his employment, and he may be responsible even though the servant exceeds or disregards his instructions. Whatever acts are reasonably incident to the occupation in which the servant is employed and are performed by him with a view to his master's business are within 'the scope of his employment.' The servant may exercise a certain amount of discretion and though in doing so he errs, the master will be responsible if the act was committed in the prosecution of his business, even though the act be wilful.

The test in determining the master's liability is not whether the act complained of is wilful, but whether it is within the scope of the servant's employment.

The contract of hiring may be terminated by the master before its expiration, for immoral conduct, wilful disobedience of orders, and gross incompetence to perform his duty; a habit of intoxication has been held to be sufficient cause. In such cases, the servant forfeits the wages for the period that he has served, and the effect is the same if he leaves the service before the end of the term without reasonable cause. If the servant is prevented from completing his contract by sickness, he may recover for the services actually rendered. If he is unjustly discharged, he may treat the contract as rescinded, and sue the master for damages for breach of contract; and in such an action he may recover the value of the services actually rendered by him. It is the duty of the servant when so discharged to endeavor to secure other employment in order to reduce the damages recoverable against his master. The master is under no legal obligation to give a testimonial of character to his servant. But if he does, he will be liable for any injury sustained by the servant, if what he says is proved to be untrue, unless he can show that he spoke without malice and had sufficient cause for what he said.—See HIRING.

MAS'TER-SINGERS: see MINNESINGERS.

MASTERWORT, *mâs'tėr-wėrt* (*Peucedanum Ostruthium*): a perennial plant of nat. ord. *Umbelliferæ*, having a stem one ft. to two ft. high, broad bi-ternate leaves, large flat umbels of whitish flowers, and flat, orbicular, broadly margined fruit. It is a native of n. Europe and the north part of N. America. Its root was formerly cultivated as a pot-herb, and held in great repute as a stomachic, sudorific, diuretic, etc.; its virtues being reckoned so many and great that it was called *divinum remedium*. It still retains a place in the medical practice of some countries of Europe, though, probably, it is nothing more than an aromatic stimulant. The root has a pungent taste, causes a flow of saliva, and a sensation of warmth in the mouth, and often affords relief in toothache.

MASTIC, n., or MASTICH, n. *măs'tĭk* [F. *mastic*—from L. and Gr. *mastīchē*, an odoriferous gum from the mastic-tree: It. *mastice*]: species of gum-resin yielded by the Mastic or Lentisk tree (*Pistacia lentiscus*, natural order *Terebinthaceæ*). It oozes from cuts made in the bark, and hardens on the stem in small round, tear-like lumps of a straw-color, or, if not collected in time, it falls on the ground; in the latter state, it acquires some impurities, and is consequently less valuable. The chief use of this gum-resin is in making the almost colorless varnish for varnishing prints, maps, drawings, etc. It is used also by dentists for stopping hollow teeth, and was formerly used in medicine. It is imported in small quantities, chiefly from the Morocco coast, but some is occasionally brought from the s. of Europe.—The name M. is given also to oleaginous cements or plaster for covering walls, composed of about 7 parts of litharge and 93 of burned clay, reduced to fine powder, made into a paste with linseed oil. MASTICINE, or MASTICIN, n. *măs'tĭ'sĭn*, the portion of mastic insoluble in alcohol.

MASTICADOR, n. *măs-tĭ-kā'dėr* [Sp. *mastigador*—from L. *mastico*, I chew]: part of a bridle; a slavering bit.

MASTICATE, v. *măs'tĭ'kāt* [L. *masticātus*, masticated: Gr. *mastax* or *mastăkă*, the jaw]: to chew as food; to grind food with the teeth, thus preparing it for swallowing and digestion. MAS'TICATING, imp. MAS'TICATED, pp.: ADJ. chewed. MAS'TICATOR, n. *-kā-tėr*, a kneading-trough for India-rubber or gutta-percha. MASTICABLE, a. *măs'tĭ-kă-bl*, that can be chewed. MAS'TICA'TION, n. *-kā'shŭn*, the act of chewing solid food. MASTICATORY, a. *măs'tĭ-kā'tėr-ĭ*, adapted for chewing: N. a substance to be chewed to increase the saliva.

MASTICOT, n. *măs'tĭ-kŏt*: see MASSICOT.

MASTIFF, n. *măs'tĭf* [OF. *mestif*, mongrel: It. *mastine*; Sp. *mastin*, a mastiff: Venet. *mastino*, large-limbed: prov. Eng. *masty*, very large and big: comp. Gael, *madadh*, a large dog]: large and strong dog, of which one variety has been known from ancient times as peculiarly English, and another is found in Tibet. No kind of domestic dog has more appearance of being a distinct species than this, and it shows little inclination to mix with other races, though the English M. has been in part crossed with the stag-hound and blood-hound. The ENGLISH M. is large and powerful, with large head, broad muzzle, large, thick, pendulous lips, hanging ears of moderate size, smooth hair, and a full but not bushy tail. It is generally 25 to 28 inches high at the shoulder, but a greater size is sometimes attained. The M. is very courageous, and does not flee even from the lion, for which three or four of these dogs are said to be a match. The Gauls trained British mastiffs, and employed them in their wars. The M. is now valued chiefly as a watch-dog, for which no dog excels it; and while it faithfully protects the property intrusted to it, it has the addi-

tional merit of refraining from any great injury of the invader. It becomes much attached to its master, though not very demonstratively affectionate; it is excelled by many kinds of dogs in sagacity. The English mastiff is usually of some shade of buff color, with dark muzzle and ears. The ancient English breed was brindled yellow and black.—The mastiff of TIBET is larger than the English; the head is more elevated at the back; the skin, from the eyebrow, forms a fold which descends on the hanging lip; the hair is very rough, and the tail bushy; color mostly a deep black.

MASTITIS, n. *măs-tī'tĭs* [Gr. *mastos,* an udder, a breast, and *itis,* denoting inflammation]: in *med.,* inflammation of the breast.

MASTLIN, n. *măst'lĭn.* See MASLIN.

MASTODON, n. *măs'tō-dŏn* [Gr. *mastos,* a breast or nipple; *odous* or *odonta,* a tooth]: in *geol.,* a genus of Tertiary and post-Tertiary elephantine mammals—so called from the nipple-like protuberances on the grinding surfaces of their teeth. They are nearly allied to the elephant, but with simpler grinding teeth, adapted for bruising coarser vegetable substances, or perhaps fitted for an animal of a more omnivorous character than its modern representative. The mastodon is distinguished from the elephant only by the teeth, and the variations in these are gradations so numerous and almost imperceptible as to indicate that the distinction between the two is really arbitrary, though convenient. Eleven or twelve species have been described from the Miocene, Pleiocene, and Pleistocene strata in Europe, Asia, and America: in Asia and Europe, in the Miocene and Pleiocene; in America, in the Pleiocene and Pleistocene. The range in North America was from Canada to Texas: probably the most complete skeleton was found at Newburgh, N. Y., 1845. It is now in Boston, and is 11 ft. high and 17 ft. long, with tail adding 6 ft. 8 in., and tusks projecting 8 ft. 8 in. About 30 species are described (see Dr. J. C. Warren, *The Mastodon Giganteus of North America,* 2d ed. 4to, Boston 1855). The South American mastodon was similar.

MASTODYNIA, n. *măs'tō-dĭn'ĭ-ă* [Gr. *mastos,* breast; *odŭnē,* pain]: in *med.,* pain of the breast.

MASTOID, a. *măs'toyd* [Gr. *mastos,* a breast; *eidos,* appearance]: nipple-like; teat-like.

MASTOID PROCESS: a rounded projection at the inferior posterior portion of the temporal bone, below and behind the external ear; its interior is cancellous in structure and communicates with the ear drum, often becoming inflamed in cases of diseases of the middle ear.

MASTOLOGY, n. *măs-tŏl'ŏ-jĭ* [Gr. *mastos,* a breast; *logos,* discourse]: that branch of zoology which treats of animals that suckle their young.

MASTURBATION, n. *măs'tėr-bā'shŭn* [L. *manus,* hand; *stuprātiōnem,* defilement]: self-pollution; onanism.

MAT, n. *măt* [L. *matta,* a mat of rushes and the like: F. *natte;* Ger. *matte,* a mat, properly a bunch or tuft of rushes or the like: Sp. *mata,* a bush]: a thick texture formed by weaving or plaiting together rushes, straw, rope-yarn, or other substances, laid at the entrance of a house or apartment, that the boots or shoes of those about to enter may be cleaned or rubbed on it; an article woven or plaited of straw, etc., for putting beneath dishes at table; a fancy article of worsted or other material to put beneath a drawing-room ornament; a frame of cardboard that forms a border for a picture: V. to twist together or interweave like a mat; to felt or entangle; to grow thick together. MAT'TING, imp.: N. a thick texture formed of straw, rope, jute, and the like, used for purposes of cleanliness, for packing, and for covering the floors of houses. MAT'TED, pp.: ADJ. laid with mats; entangled.

MATABELE: Kafir people, speaking one of the Bantu tongues, whose territory lies between the Zambesi and Limpopo rivers in southeastern Africa. See *Matabele Land,* by Oates (1881).

MATABELELAND, *mâ-tā-bā'lĕ-lănd:* South Africa, the southeastern district of Rhodesia (q.v.) between the Limpopo and Zambesi, north of the Transvaal. In 1889 it came under the administration of the British South Africa Company, against whom the natives unsuccessfully rebelled in 1893 and in 1896. The Matabili are a war-like Kafir race, who migrated from Natal in 1827 under their chief Umsilikatse. The country is traversed by ranges of hills—the Matoppo hills being the chief—is watered by numerous streams, has good pasture, and is believed to be rich in gold. It is now being rapidly settled and developed. Buluwayo is the capital.

MATADORE, or MATADOR, n. *măt'ă-dōr'* [Sp. *matador,* slayer—from *matar,* to kill—from L. *mactārĕ,* to honor by sacrifice, to kill]: one of the three principal cards at ombre and quadrille: in *Sp. bull-fights,* he who is appointed to kill the disabled bull. See BULL-FIGHT.

MATAMORAS, *măt-a-mō'ras,* or MATAMOROS, *mâ-ta-mō-rōs:* river-port of Mexico, department of Tamaulipas, on the s. bank of the Rio Grande, 40 m. from the mouth of that river in the Gulf of Mexico. The chief exports are specie, hides, wool, and horses; chief imports, manufactured goods from the United States and Great Britain. It is opposite Brownsville, in Texas, with which there is extensive trade and much smuggling. Pop. 20,000.

MATAMOROS, *mâ-ta-mō'rōs,* MARIANO: Mexican patriot and revolutionary leader; one of three priests, Hidalgo, Morelos, and Matamoros, who conducted, and perished in, the earliest insurrection of Mexico against Spanish rule. After the first revolt under Don Miguel

Hidalgo 1810, and his defeat and execution 1811, Morelos took up the struggle, and maintained it until he met the same fate 1815. In 1811 Matamoros, parish priest of Jantelolco, a small village south of the City of Mexico, joined the insurgents under Morelos, was made a colonel, and at once showed great military talent. In the defense of Cuautla, against General Calleja, where Morelos had defeated the Spaniards with great loss 1812, Feb. 19, and they had with a fresh army besieged him for several weeks, the glory of a masterly escape May 2 was more that of Matamoros than that of Morelos. In an expedition to Oaxaca Matamoros was conspicuous, and 1813, Oct., he won the victory of San Augustin del Palmar. The success of the revolution seemed now assured, except in a few of the larger cities, until Morelos rashly, against Matamoros' judgment, risked an attack on the capital of Michoacan (Valladolid, now Morelia), and met severe defeat from Iturbide. Matamoros collected his forces at Puruaran, and Morelos again rashly precipitating an action Matamoros was taken prisoner, and a few days later was shot at Valladolid 1814, Feb. 13. Morelos met a similar fate the next year. Alaman, in his *History of Mexico,* describes Matamoros as the most able military leader of the first revolution. In the cathedral of Mexico the remains of the three priest-soldiers who gave their lives in the founding of Mexican liberty, rest in honor together. In honor of Matamoros are named the city of Matamoros on the Rio Grande, and other towns.

MATANZAS, *mă-tăn'zas* (Sp. *mâ-tân'thâs*): Cuba, a seaport city on the north coast, capital of Matanzas province, 52 m. by rail e. of Havana. It is situated on Matanzas bay, one of the largest, safest, and most convenient harbors of the western hemisphere. The city is well-built with wide, regular, and paved streets, handsome plazas, and public buildings, and good railway communications. The caves of Bellamar, and Yumuri valley, in the neighborhood, are two popular natural resorts. Matanzas ranks in importance next to Havana in the export of sugar, molasses, and coffee, the exports of sugar alone averaging annually about $15,000,000. The city was bombarded by the United States warships during the Spanish-American war in 1898, the only casualty, widely telegraphed, being an injury to a 'Matanzas mule,' which made the animal famous. Pop. 36,374.

MATAPAN, *mâ-tâ-pân',* CAPE: southernmost point of the Morea, in Greece, lat. 26° 33′ n.: see CAPE MATAPAN.

MATCH, n. *măch* [AS. *maca,* a companion: Icel. *maki,* a spouse: Norw. *makje,* a mate]: one equal to another in strength or in some other quality; anything that equals another or tallies with it; a contest; a game; union by marriage; one about to be married: V. to oppose or set against as equal; to suit; to give in mar-

riage; to marry; to tally. MATCH'ING, imp. MATCHED, pp. *măcht.* MATCH'ABLE, *-a-bl,* that can be joined or compared; suitable; equal. MATCH'ER, n. *-ėr,* one who matches. MATCH'LESS, a. *-lĕs,* having no equal. MATCH'-LESSLY, ad. *-lĭ.* MATCH'LESSNESS, n. *-nĕs,* the state or quality of being without an equal. MATCH-MAKER, one who endeavors to bring about marriages. MATCH-PLATE, a wooden board or plate of metal on the opposite faces of which two different portions of a pattern are attached. When the boxes containing the impressions are brought together, they constitute a complete mold. In some cases they are very useful for facilitating the making of joints, but they are generally used for making molds for castings having plain outlines, without sharp corners, cores, or projections.

MATCH, n. *măch* [OF. *mesche* and *meiche;* F. *mèche,* the wick or snuff of a candle—from mid. L. *myxa,* the wick of a candle or lamp: Gr. *muxa,* the snuff or snivel of the nose; comp. Gael. *maide,* a stick]: anything that readily takes fire, and is capable of setting fire to, or giving light; a slender piece of wood or piece of twisted fibre for igniting a candle or lamp. MATCH-LOCK, the old musket which was fired by a match (see LOCK, of a gun). MATCH-MAKER, one who manufactures matches for burning. QUICK-MATCH, a match made of such materials as burn quickly, as cotton-wick steeped in gummed whisky or brandy, and covered with a preparation of meal. SLOW-MATCH, a match for burning slowly.

MATCH'ES: small thin pieces of various inflammable materials prepared for the purpose of obtaining fire readily. One of the first forms of this useful article was the brimstone match, made by cutting very thin strips of highly resinous or very dry pine-wood, about 6 in. long, with pointed ends dipped in melted sulphur; thus prepared the sulphur points instantly ignited when applied to a spark obtained by striking fire into tinder from a flint and steel. This was in almost universal use till about 1825, when it was displaced by several ingenious inventions in rapid succession. The first of these was the 'Instantaneous-light Box,' a small tin box containing a bottle, in which was some sulphuric acid with sufficient fibrous asbestos to soak it up and prevent its spilling out of the bottle, and a supply of properly prepared matches. These consisted of small splints of wood about 2 in. long, one end of which was dipped first into melted sulphur, and afterward into a paste of prepared chemical mixture. They were readily inflamed by dipping the prepared ends into the bottle of sulphuric acid. In this ingenious invention the arrangement was inconvenient and the acid soon lost its power. The Lucifer match succeeded it: the matches were small strips of pasteboard or wood, and the inflammable mixture was a compound of chlorate of potash and sulphuret of antimony, with enough of powdered gum to render it ad-

hesive when mixed with water, and applied over the end of the match, dipped as before in melted brimstone. These matches were ignited by the friction caused by drawing them between the folds of a piece of folded sand-paper. So popular did these become, that their name has been popularly applied to other kinds since invented. Afterward was the Congreve, a modification of which is still commonly used. The body of the match is usually of wood; but some, called Vestas, are of very thin wax-taper. The composition consists of phosphorus and nitre, or phosphorus, sulphur, and chlorate of potash, mixed with melted gum or glue, and colored with vermilion, red-lead, umber, soot, or other coloring material. The proportions are almost as varied as the manufacturers are numerous. Amadou, or German tinder, is largely made into Congreve matches or fusees, as they are often called, for lighting pipes or cigars. One of the latest and best introductions is properly called the 'Special Safety Match.' With every variety of Lucifer and Congreve, there are dangers attending the use; for both ignite by a slight friction, and have doubtless been the cause of numerous disastrous fires. The phosphorus in the Congreves adds the danger of spontaneous ignition if the temperature is a little higher than ordinary. The safety match was invented in Sweden, by Lundstrom, manufacturer of matches at Jönköping, 1855 or 6. There is no phosphorus in the safety match itself; instead, the other elements in the match are brought into contact with the prosphorus (*red* phosphorus) only on the friction-surface provided on the match-box, which surface contains also sulphide of antimony. In spite of this precaution, safety matches will, with sharp friction, light on smooth paper, wood, dry glass, and other substances; but they light *readily*, 'only on their own box.' *Fusees* and *Vesuvians* are matches expressly designed for lighting pipes and cigars.

Many ingenious inventions have been introduced for making the wooden splints. The square ones, usually considered the best, are cut very simply by two sets of knives acting transversely to each other. The round ones are cut by a perforated steel plate invented 1842. The perforations are the same size as the splints; and their edges are sufficiently sharp, when pressed on the transverse section of the wood, to cut down through it. The various ornamental forms of the German match-makers, who excel in this manufacture, are produced by planes, the irons of which are so constructed as to plow up splints of the form required. These are usually made of a soft kind of pine-wood—that of *Abies pectinata* is preferred in Austria and Germany—of which vast quantities are yielded by the forests of Upper Austria. Until the introduction of amorphous phosphorus (see PHOSPHORUS), the trade of match-making was fearfully unhealthful; the emanation of phosphoric acid, when com-

mon phosphorus was used, gave rise to necrosis, or mortification of the bones, and fatal effects often followed. Some manufacturers are still using the common kind for cheapness. This abuse demands legislative interference.

The trade in matches has assumed enormous dimensions in Germany, Austria, Norway, Sweden, France, and the United States.

MATE, n. *māt* [Icel. *mati*, an equal, a fellow: Dut. *maet*, a comrade. OHG. *gamazi*, a table-companion—from OHG. *maz;* Icel. *matr*, food: said also to be allied to *meet*, measured, suitable, equal]: a companion; an associate; one who associates with another and eats at the same table, sails in the same ship, or is employed at the same place; an officer of a merchant-ship next the master or captain; a husband or wife; the male or female of two animals which associate for the propagation of their species: V. to match; to marry; to equal, or be equal to. MA'TING, imp. MA'TED, pp. CLASSMATES, members of the same class in college. PLAYMATE, a young person companion to another in recreations or amusements.

MATE, n. *māt* [F. *mat*, subdued: Dut. *mat*, overcome: Sp. *mate*, faded: Pers. *sháh-mát*, the king is dead: Ar. *máta*, he died]: in the game of chess, the state of the king when he cannot escape, called CHECK-MATE. See under CHECK.

MATE: nautical officer. In the United States navy, a mate is a line-officer not in the line of promotion; he holds his position by appointment, messes in the steerage, and does such duty as the commanding officer prescribes. The term is also applied to the assistant of the boatswain, gunner, armorer, etc. The term was formerly applied to a grade between lieutenant and midshipman, now known in the United States navy as the junior grade.

In the merchant service the first or chief mate is next in rank to the master, and takes command of the ship in case of the absence, disability, or death of the latter; he is not removable by the master except for cause. The second mate commands the starboard watch, leads the crew in reefing, etc. Large merchantmen have sometimes a third, or even a fourth mate.

MATÉ, *mâ-tā'*, or PARAGUAY TEA, *păr-a-gwā* or *pâ-râ-gwī':* substitute for tea, used extensively in South America, and almost universally in Brazil. It consists of the leaves and green shoots of certain species of holly (q.v.), more especially *Ilex Paraguayensis*, dried and roughly ground; the leafy portion being reduced to a coarse powder, and the twigs being in a more or less broken state, sometimes, however, as much as an inch in length. The term *maté*, which has by usage attached to this material, belonged originally to the vessels in which it was infused for drinking; these were usually made of gourds

or calabashes, often trained into curious forms during their growth. Into the hollow vessels thus formed, a small quantity of the material, properly called *Yerba de Maté,* is put, and boiling water is added; it is then handed round to those who are to partake of it; and each being provided with a small tube about 8 in. in length, with a small bulb at one end, made either of basket-work of wonderful fineness, or of perforated metal, to act as a strainer, and prevent the fine particles from being drawn up into the mouth, dips in this instrument, which is called a *bombilla,* and sucks up a small portion of the infusion, and passes the maté-bowl on to the next person. It is usual to drink it exceedingly hot, so much so as to be extremely unpleasant to Europeans. Its effect is much the same as tea, stimulating and restorative, having a large proportion of the principle *theine* found in tea and coffee. The collection and preparation of maté is a large industrial occupation in Paraguay and Brazil; and not only *Ilex Paraguayensis,* but also *I. curitibensis, I. gigantea, I. ovalifolia, I. Humboldtiana,* and *I. nigropunctata,* besides several varieties of these species, are in general use. It is remarkable that when caffeic acid, to which coffee owes its agreeable flavor, independently of the theine, is treated with sulphuric acid and binoxide of manganese, it forms kinone; and by treating the maté with the same agents, kinone has also been obtained. More than 5,000,000 lbs. of maté are annually exported from Paraguay to other parts of South America; but it is not yet an article of export to other quarters of the world.

Ilex Paraguayensis is a large shrub or small tree; with smooth, wedge-shaped, remotely serrated leaves, and umbels of small flowers in the axils of the leaves. The leaves of many species of holly possess properties very different from those of the maté trees. Some are emetic.

MATER, n. *mā'tėr* [L. *māter;* Gr. *mētėr,* a mother]: a name given to two of the membranes which cover the brain, called respectively the *dura-mater* and *pia-mater*—so named because formerly supposed to be the source of all other membranes. ALMA-MATER, the university at which one has studied.

MATERFAMILIAS, n. *mā'tėr-fă-mĭl'ĭ-ăs* [L.—from *māter,* a mother; *familĭă,* a household, a family, *familĭās,* of a family]: the familiar name of a female-parent or mistress of a family—the father being called *pater-familias.*

MATERIAL, a. *mă-tē'rĭ-ăl* [F. *matériel*—from L. *materĭālis,* belonging to matter—from *materĭă,* matter: It. *materiale*]: consisting of matter; not spiritual; corporeal; important; essential; not merely formal; substantial: N. anything composed of matter; that of which anything is made. MATE'RIALLY, ad. *-lĭ,* in the state of matter; importantly; essentially. MATE'RIALNESS, n. *-nĕs,* the state of being material. MATE'RIAL'ITY, n. *-ăl'ĭ-tĭ* [F.

materialité]: material existence; not spirituality. MATERIALIZE, v. *mă-tē'rĭ-ăl-īz*, to render material; to reduce to matter, or to regard as such; to have a tendency toward materialism. MATE'RIALIZING, imp.: having a tendency toward materialism. MATE'RIALIZED, pp. *-īzd*. MATE'RIALIST, n. *-ĭst*, one who maintains that the soul of man, and even all existence and consciousness, is but the result of a particular organization of the matter of which the body is composed. MATE'RIALISM, n. *-ăl-ĭzm*, the doctrine or belief of a materialist. MATE'RIALIS'TIC, a. *-ăl-ĭs'tik*, having a tendency to materialism.—SYN. of 'material, a.': bodily; weighty; momentous.

MATERIALISM: term in philosophy, denoting that theory of the universe which regards matter as the underlying substance of all forms of existence, and movements of matter as the causes of all vital and mental processes, no less than of physical processes. One contrasting view is Spiritualism, which holds that the mind is not essentially dependent on material organs, but may have an existence apart from these. If matter be allowed an independent existence along with spirit, we have then a dualistic theory of reality. The radical antithesis of materialism is Objective Idealism, which maintains that all existence is ultimately constituted and controlled by the activity of mind.

Present experience tells us nothing of disembodied minds. The facts of normal experience, as well as of bodily and mental disease, indicate the constant interdependence of mind and body; and it is an induction, which gains fresh evidence constantly, that no mental processes occur without accompanying bodily processes. And yet bodies are extended and divisible in space, have weight, color, etc.; whereas minds are neither extended or divisible, have not weight or color. The intimate correlation and the striking contrast between mind and body make the problem of their relation very acute. There are almost insuperable difficulties in the way of explaining matter in terms of mind, although these are somewhat lightened by the tendency to conceive matter in terms of energy or force. Materialism fails, however, as a theory of reality, for the following reasons: (1) The fundamental assumption of scientific materialism is that the changes in the material world constitute a closed series (principle of *Conservation of Force*). Now, it is utterly unintelligible that a blind unconscious universe should give rise, as a by-product, to a consciousness of itself. Consciousness is, upon such a hypothesis, a miracle. (2) It is not possible to conceive how physical processes are transformed into mental. (3) Materialism fails to account for the belief of mind in its own efficacy—a belief which facts warrant. (4) In concrete experience we do not find a substance called matter. 'Matter' is an abstraction. What we do find in experience is an organic whole, consisting of thinking, act-

ing, minds having various relations of action and passion to a multiplicity of bodies with a variety of properties. Bodies, then, are elements in our total experience. Minds apprehend and comprehend them, alter their movements and relations. The solution of the world-old problem of Materialism *vs.* Idealism lies, perhaps, in abandoning the attempt to conceive mind and body as standing in the ordinary relations of cause and effect, and in recognizing that the physical is the instrument of the mental. The apparent opposition of physical and mental may be really the means by which mind develops self-consciousness, and the function of the physical may be to give expression to the moral, esthetic, social, and religious values, which it is the destiny of mind to make effective in this two-sided world. From this viewpoint we can admit the reality of bodies and, at the same time, be idealists, in the sense of holding that the physical process may be controlled by spiritual principles. See ATHEISM; CONSCIOUSNESS; DUALISM; GOD; IDEALISM; MATTER; MIND; PANTHEISM.

MATERIAL LOGIC: a term invented in the 14th c. to indicate a kind of logic distinguished from formal logic and applicable only to a system of facts or relations definitely specified and limited. Thus the formal logic of Aristotle was held to be applicable to the physical world as we know it, but not applicable to the relations which obtain of and in God. The term is often used as synonymous with applied logic. See LOGIC.

MATERIA MEDICA, n. *mă-tē'rĭ-ă mĕd'ĭ-kă* [L. *materĭă*, substance; *medĭca*, medical]: department of the science of medicine which treats of the substances natural or artificial employed for alleviation and cure of disease. In the description of an inorganic compound, e.g., iodide of potassium or calomel, the writer on materia medica notices (1), its physical properties; (2), its various modes of preparation; (3), its chemical composition and relations, including the tests for its purity, and the means of detecting its probable adulterations; (4), its physiological action on man and animals in large and small doses; (5), its therapeutic actions and uses, and the average doses in which it should be prescribed; and (6), the official preparations containing the substance in question, and their uses and doses: while the notice of an article belonging to the organic department must treat also of the natural history of the source whence it is obtained, and the mode of collecting or extracting it.

MATÉRIEL, n. *mă-tā'rĭ-ĕl'* [F]: that which, in a complex system, constitutes the articles, or instruments employed, as distinguished from the *personnel*, or men employed: thus the baggage, arms, provisions, etc., of an army.

MATERNAL, a. *mă-tėr'năl* [F. *maternel*—from L. *ma-*

ternālis—from *maternus*, belonging to a mother—from *māter:* Gr. *mētēr*, a mother: It. *materno*]: pertaining to a mother; befitting a mother; motherly. MATER'NALLY, ad. *-lĭ.* MATERNITY, n. *mă-tėr'nĭ-tĭ* [F. *maternité*]: the character or relationship of a mother.

MATH, n. *măth* [AS. *mædh*, a mowing—from *mawan*, to mow]: a mowing; a crop, as in *aftermath.*

MATHEMATICAL INSTRUMENTS AND MODELS: the instruments employed in accurate measurement have a wide range, from the scale and divided arc (protractor) to the chain, level, and transit of the surveyor, the sextant, theodolite and solar compass, and the still finer astronomical equatorial, meridian and mural circles, etc. To these should be added the planimeter, used in measuring areas. Another class is designed to facilitate computation; here belong the slide rule and the various forms of calculating machines, arithmometers, etc. With these may be included the harmonic analyzers employed in breaking up a varying quantity (as the height of the tide) into its simple constituents. Finally various instruments are used for geometric construction, as the ruler and compass, the parallel rulers, the pantagraph, the many machines for tracing curves, as the ellipsograph, the Peaucellier inversor (which converts circular into rectilinear motion), the mechanisms for dividing an angle into equal parts, etc. For the more important instruments see the separate titles.

Mathematical models were formerly largely confined to illustrations of the Euclidean geometry and such simple types as the quadric surfaces, ruled surfaces, etc. Of recent years great advances have been made in this field and elaborate sets of models may now be procured covering practically the whole field of higher geometry and kinematics. One of the largest collections in America is contained in the mathematical seminar of Columbia University. Collections for schools are supplied by a large number of manufacturers. The finest collection of higher grade models is furnished by M. Schilling, of Halle, Germany.

MATHEMATICAL LOGIC: a term applied to the type of analysis and thought procedure employed in mathematics. The term is often used of symbolic logic (q.v.).

MATHEMATICS, n. plu. *măth'ĕ-măt'ĭks* [L. *mathemat'ica:* Gr. *mathemat'ikē*, mathematical science, connected with *manthănō*, I learn: F. *mathématiques*, mathematics]: science of quantity, number and order; distinguished by its purely deductive logic; the science that draws necessary conclusions (Peirce); one of the 'normative' sciences (Münsterberg). Its grand divisions are analysis, geometry, and applied mathematics. MATH'EMAT'ICAL, a. *-măt'ĭ-kăl*, or MATH'EMAT'IC, a. *-ĭk*, pert. to mathematics; according to, or done by, mathematics; demonstrative. MATH'EMAT'ICALLY, ad. *-lĭ.* MATH'EMATI'-

CIAN, n. *-mă-tĭsh'ăn*, one who is skilled in mathematics. PURE MATHEMATICS deals with symbols without reference to their concrete significance. APPLIED MATHEMATICS employs mathematical methods for treating natural phenomena, as in astronomy, mechanics, and physics, or other concrete subjects, as statistics, insurance, etc. (See MATHEMATICS, below.) MATHEMATICAL PROOF, a proof as logically convincing as a mathematical demonstration.

MATHEMATICS: elementary mathematics has for its subject matter the properties of number and space. But in its higher branches the modern science has long outgrown these limitations. Pure mathematics deals with abstract symbols with assigned laws of combination. It is distinguished among the sciences by its deductive logic, its aim being to set forth all the necessary consequences of a given set of premises. The latter may be chosen in any way provided they are consistent with each other, and it is the privilege of the mathematician to survey all possible combinations, to deduce the consequences of each, and to select for special consideration those which appear most fruitful. The science therefore affords the highest field for constructive genius as well as for the development of logical rigor.

The oldest branches of mathematics, arithmetic and geometry, may be traced back to the ancient Babylonians and Egyptians. But it was the Greeks who first erected them into rational sciences, and carried them to a point beyond which only slight advances were made for fifteen hundred years. Among the Romans mathematics was mainly confined to the simplest practical uses, mathematicians and astrologers being included together under the one name 'mathematici.' For the history of the rise of algebra and geometry, see these titles. The renaissance brought to mathematics a wealth of fructifying ideas. The 16th and 17th centuries saw the great development of trigonometry, with the introduction of logarithms, the invention of analytic geometry and the calculus, and the application of these new methods to the problems of mechanics. The work of digesting this new material occupied mathematicians for another hundred years. With the 19th century came renewed activity in creating new branches, such as projective geometry, the theory of functions of a complex variable, invariants, groups, etc. The recent growth of mathematics is quite comparable with that of other sciences. A summary of the present day extent of the science is found in the *Encyklopädie der mathematischen Wessenschaften*, published by Teubner in fifteen large octavo volumes. An encyclopedia of elementary mathematics is published by the same firm in three volumes. At present there are throughout the world some fifty journals regularly issued which are devoted exclusively to mathematics. Five of these are published in the United States.

For the history of mathematics the reader may consult Ball, or Beman and Smith's translation of Fink. On the teaching of elementary mathematics, see D. E. Smith's book with this title. An account of the teaching and history of mathematics in the United States down to 1890 is given by Cajori in a publication of the U. S. Bureau of Education.

MATHER, *măth'ẽr*, COTTON, D.D.: minister of the North Church (Congl.), Boston, in early colonial days: 1662, Feb. 12—1728, Feb. 13; b. Boston; eldest son of Increase Mather and Maria Cotton. He entered Harvard College when 12 years old, and his precocity and piety excited great expectations. He entered upon a course of fasting and vigils, cured a habit of stammering by speaking with 'dilated deliberation,' studied theology, was ordained co-pastor with his father, and was pastor of the North Church, Boston, 1685-1728. He was a laborious pastor, an indefatigable preacher, an eminent philanthropist—both in his personal charities and in organizing a score of societies for public charity; and introduced at great personal risk, and against popular opposition, the preventive inoculation against small-pox in America. Mather was a man of great learning, an author in English, French, Spanish, and Algonquin: 382 printed works by him are catalogued, of which several are large books; besides his great work in 6 vols. manuscript, *Biblia Americana,* not printed. Mather was in correspondence at one time with more than 50 learned Europeans, and was made a fellow of the Royal Soc.—then a rare distinction. His *Essays to do Good* were highly commended by Benjamin Franklin. The phenomenon termed 'Salem Witchcraft' having appeared in the colony, he investigated it, and wrote, 1685, *Memorable Providences relating to Witchcraft and Possessions;* and 1692, *Wonders of the Invisible World.* Mather's enormous learning and diligent conscience were not equaled by his tact, delicacy, or sense. He was ambitious and opinionated; and made himself unfortunately prominent in the witchcraft delusion—a superstition which he shared with the age in which he lived. In all countries of Europe, and in various parties in the state and the church in England, this frightful delusion held sway: Richard Baxter justified it; Sir Matthew Hale, Lord Chief Justice of England, universally held to be the most acute and upright jurist of his times, sentenced women to be burned as witches. Mather's natural infirmities and his intemperate zeal, with his great prominence, caused him to be deeply entangled in this snare; which is now remembered against him as though it set him apart from all other men. Later—too late—he admitted 'a going too far in that affair.' Mather died in Boston.

MATHER, INCREASE: minister of the North Church (Congl.), Boston, in early colonial days: 1639, Jan. 21—1723, Aug. 23; b. Dorchester, now a part of Boston; son

of Richard Mather (q.v.). He was educated at Harvard College, graduating 1656; and at Trinity College, Dublin. He was pastor of the Second (or North) Church, Boston, 1664-1723, almost 60 years; and for 17 years (1685-1701) president of Harvard College, for which he obtained the right to confer the degrees B.D. and D.D. An industrious student, he spent 16 hours a day in his study, and published 160 books or tracts, most of which are now very scarce. One of these, entitled *Remarkable Providences,* was republished in the Library of Old Authors (London 1856). His influence was so great in the colony that he was sent to England 1688 to secure a new charter for the Massachusetts colony, and had the appointment of all the officers under it. He spent four years in this public service. He was regarded as the foremost minister of his time in America. Mather married 1682 Maria, daughter of the Rev. John Cotton (q.v.).

MATHER, RICHARD, D.D.: one of the early settlers of New England: 1596-1669, Apr. 22; b. Lowton (Winwick), England; son of Thomas Mather. He studied at Oxford University, leaving to take charge of the church at Toxteth Park 1618. His Puritanism brought persecution, and he escaped in disguise, landing at Boston 1635, Aug. 17. He established the present First Church at Dorchester (a former church had emigrated in a body to Connecticut), and was its pastor till his death. His youngest son, Increase Mather, was father of Cotton Mather. He acquired great repute as preacher, and an expounder and advocate of the New England way of church-order. Mather was moderator of the council of churches whose result was the formation 1669 of the third church in Boston—the Old South Church.

MATHER, WILLIAM WILLIAMS: American geologist: b. Brooklyn, Conn., 1804, May 24; d. Columbus, Ohio, 1859, Feb. 26. He was graduated from West Point in 1828 and was an assistant professor of chemistry and geology there 1829-35. After a short period spent as professor of chemistry at the University of Louisiana (1836), he undertook the superintendence of a geological survey of the 1st district of New York state, which included the Hudson river counties, a labor which lasted from 1836 to 1844. He was also state geologist of Ohio 1837-40, and of Kentucky 1838-9, and from 1842-5, and 1847-50, professor of natural science in the Ohio University at Athens. He contributed frequently to scientific journals, edited the *Western Agriculturist* for a time and published *Geology of the First Geological District* in *Natural History of New York* (1843).

MATHESIS, n. *măth-ē'sĭs* [Gr. *mathēsis,* learning]: learning; the doctrine of mathematics.

MATHESON, *măth'ĕ-son,* GEORGE, D.D., LL.D.: Scottish Presbyterian clergyman: b. Glasgow 1842, March 27. He was educated at Glasgow University, and although he

had lost his sight he entered the ministry of the Kirk of Scotland and was ordained in 1868. He was in charge of St. Bernard's Church, Edinburgh, 1886-99. Among his many published books are: *Aids to the Study of German Theology* (1874); *Natural Elements of Revealed Theology* (1881); *The Psalmist and the Scientist* (1887); *Sidelights from Patmos* (1897); *The Sceptre Without a Sword* (1901); *The Representative Men of the Bible* (1902); *Leaves for Quiet Hours* (1904); *The Representative Men of the New Testament* (1905); etc.

MATHEW, *măth'ū*, FRANK: English novelist: b. Bombay 1865. He was educated at London University and became a solicitor in 1889. He has published: *Father Mathew: his Life and Times* (1890); *At the Rising of the Moon; Irish Stories and Studies* (1893); *The Wood of the Brambles* (1896); *The Spanish Wine* (1898); *The Royal Sisters* (1901); *Ireland* (1905); etc.

MATHEW, *măth'ū*, THEOBALD, commonly known as FATHER MATHEW: 1790, Oct. 10—1856, Dec. 8; b. Thomastown, Tipperary, Ireland; descended from an illegitimate branch of the Llandaff family. On the death of his father while Mathew was still very young, the kindness of the Llandaff family enabled the boy to enter the Rom. Cath. college at Kilkenny, whence he was transferred as a candidate for the priesthood to the college of Maynooth 1807. He left that college, however, in the next year, relinquished the secular priesthood for that of the religious order of the Capuchins, in which he took priest's orders 1814, and was sent to the church of his order in the city of Cork. His singular charity, benevolence, and gentleness, his simple and effective eloquence, and his faithful zeal won universal love and respect. But the great work of Father Mathew's life is the marvelous reformation wrought by his eloquence and assiduity, which won for him the title APOSTLE OF TEMPERANCE. In 1838, he established in Cork an association on the principle of total abstinence, which in less than 9 months numbered 150,000 members in the city and adjacent districts. His success seemed almost supernatural; 100,000 persons are said to have signed the pledge in two days at Galway, 70,000 in five days at Dublin. The form of engagement partook of the religious, and was accompanied by the presentation of a medal, to which great reverence was attached by the recipient. His association included a large proportion of the adult population of Ireland, without distinction of rank, creed, or sex; and so complete was the revolution in the habits of the Irish people that many distilleries and breweries ceased from working. Among the sufferers from this great moral revolution were members of Father Mathew's own family, who were largely engaged in the distilling trade. In 1844 he labored in Liverpool, Manchester, and London, with great success; and he spoke to great assemblies in the United States 1849-51. It is painful to add that the

latter years of this great benefactor were clouded by pecuniary embarrassments arising out of the engagements into which he entered in the course of his philanthropic labors. Very large sums of money passed through his hands, in payment for the medals which he distributed to the members of the association, yet his great charities, and the enormous expenses of his various missions, and perhaps his own lack of prudent management involved him in painful difficulties. A pension of £300 was granted him by the queen 1847, and a private subscription also was made in his behalf. The fruit of his labors is still visible in Ireland. Though many of his enrolled members ceased after some years to observe the pledge of total abstinence, very few of these relapsed into drunkenness; and the general reform which he wrought in Ireland endures to the present day.

MATHEWS, *măth'ūz*, ALBERT: 'PAUL SIEGVOLK,' American lawyer and author: b. New York 1820, Sept. 8; d. there 1903, October. He was graduated from Yale in 1842, and after studying law was admitted to the New York bar in 1845. He soon acquired an extensive practice and was especially skilled in chancery practice. He found time for literary work despite the claims of his profession, and under the pseudonym, 'Paul Siegvolk,' published: *Walter Ashwood*, a once popular love story (1860); *A Bundle of Papers* (1879); *Thoughts on Codification of the Common Law* (1881); *Ruminations: The Ideal American Lady and Other Essays* (1892); *A Few Verses* (1893); etc. In the early part of his career he was a close friend of N. P. Willis (q.v.), whom he aided in establishing *The Home Journal*.

MATHEWS, CHARLES: English comedian: 1776, June 28—1835, June 28; b. London. He was educated at Merchant Taylor's School, London. His father was a bookseller, and intended his son for the same business; but his early inclination for the stage overcame parental counsel, and he made his first appearance as an amateur —in the part of Richard III.—at the Richmond Theatre 1793, and as a professional comedian in the Theatre Royal, Dublin, the following year. He first appeared in London at the Haymarket 1802, and subsequently he transferred his services to Drury Lane. In 1818 he gave his 'At Home' in London, and achieved an immense success. He visited America twice. In the autumn of 1828, he became joint proprietor of the Adelphi Theatre. He died at Plymouth, and was buried in that town.

Mathews was a wonderful master of personification and mimicry; and while imitating every one, he never lost a friend, or hurt the feelings of the most sensitive. He was greatly admired in social circles. His taste was as instinctive as his wit. His wonderful variety of facial expression, and his gentlemanly sarcasm, are still fondly remembered by old playgoers.—His son CHARLES JAMES MATHEWS (1803-78, b. Liverpool) also achieved reputa-

tion as a comedian unrivaled in his narrow range of light comedy

MATHEWS, Ferdinand Schuyler: American artist and author: b. New Brighton, N. Y., 1854, May 30. He was educated at Cooper Institute, studied art in Italy and has made a specialty of decorative designing. He has contributed extensively to the magazines both as illustrator and writer, in the latter field dealing chiefly with subjects which come within his own profession. He has published: *The Writing Table of the 20th Century* (1900); *The Field-Book of American Wild Flowers* (1902); *Field-Book of Wild Birds and their Music* (1904); etc.

MATHEWS, Shailer, a.m., d.d.: American educator: b. Portland, Maine, 1863, May 26. He was graduated from Newton Theological Institution in 1887 and studied in Berlin. In 1887 he was appointed assistant professor of rhetoric at Colby University, and in 1889 accepted the chair of history and political economy, which he occupied until 1894, when he was made junior dean of the divinity school in the University of Chicago and professor of New Testament history, until 1904, when he became professor of systematic theology there. He has published: *Select Mediæval Documents* (1891-1900); *The Social Teaching of Jesus* (1897); *A History of New Testament Times in Palestine* (1899); *The French Revolution: a Sketch* (1901); *Principles and Ideals for the Sunday School* (1903); *The Messianic Hope in the New Testament* (1905); *The Church and the Changing Order* (1907); etc.

MATHEWS, William, ll.d.: American author: b. Waterville, Maine, 1818, July 28. He studied law at Harvard and was admitted to the bar in 1838, practicing for a time in Waterville, but soon abandoned law for journalism. In 1862 he was appointed professor of English and rhetoric at the University of Chicago, but in 1875 resigned in order to devote himself exclusively to literature. Among his many books are: *Getting on in the World* (1873); *The Great Conversers* (1874); *Oratory and Orators* (1879); *Men, Places and Things* (1888); *Nugæ Literariæ* (1896); *Conquering Success* (1903); etc.

MATHEWS, William Smythe Babcock, mus.doc.: American musical writer and editor: b. Loudon, N. H., 1837, May 8. He obtained his musical education in Boston and became a teacher in 1853; he was for a time engaged at the Wesleyan Female Seminary in Georgia, but in 1867 he removed to Chicago, where he has been prominent as an organist and engaged in editorial work and criticism of music on the leading Chicago papers. In 1891 he established the magazine *Music*, and edited it until 1903, when it became a part of the *Philharmonic*. He is the author of: *How to Understand Music* (1880-8);

Music and Its Ideals (1897); *Dictionary of Musical Terms* (1895); *Popular History of Music* (1901); *The Great in Music* (1900-03); etc.

MATHIL'DA, COUNTESS OF TUSCANY (the Great Countess): known in history through her close political connection with Pope Gregory VII.: 1046-1114; daughter of Boniface, Duke and Marquis of Tuscany; of noble Lombard race. At her father's death Mathilda inherited Tuscany, Liguria, parts of Lombardy, Modena, and Ferrara —territories forming really a powerful state. She married Godfrey (surnamed *Il Gobbo,* or the 'Hunchback'), Duke of Lorraine, 1069, by procuration. Godfrey soon went back to his duchy, and became a supporter of Emperor Henry IV., while Mathilda made herself conspicuous by the zeal with which she espoused the cause of Gregory VII. She became his inseparable associate, was ever ready to assist him in all he undertook, and to share every danger from which she could not protect him. In 1077 (renewed 1102) she made a gift of all her possessions to the papal see—the foundation of the pope's temporal dominions. In 1081 she alone stood by the pope, when Henry poured his troops into Italy, burning to avenge his humiliation at Canossa; she supported him with money when he was besieged in Rome; and after his death at Salerno boldly carried on the war against the emperor. Her second husband was Guelph of Bavaria; but neither of her marriages was of much importance in her life. She died at the Benedictine monastery of Polirone.

MATH'URA. See MUTTRA.

MATICO, n. *măt'ĭ-kō* (*Artanthe elongata*): shrub of nat. order *Piperaceæ,* native of Peru; remarkable for the styptic property of its leaves and unripe fruit, used for stanching wounds.

MATIES, n. plu. *măt'ĭz:* a name for a certain quality of Scotch-cured herrings. See MATTIES.

MATIN, a. *măt'ĭn* [F. *matiñ;* It. *mattino,* morning—from L. *matūtīnŭm,* the morning]: pertaining to or used in the morning: N. in *OE.,* the summons to morning prayer; morning worship. MATINS, n. plu. *măt'ĭnz,* morning service or prayers; the first canonical hour for prayers in the Rom. Cath. Chh.—in the Breviary at about midnight; also spelled MATTINS, but wrongly. MATINAL, a. *măt'ĭ-năl,* pertaining to the morning. See CANONICAL HOURS.

Note 1.—Services of worship were held in times of persecution by the early Christians under cover of night, and were hence called *Nocturns; Lauds,* an early morning service, was joined to *Nocturns,* and the united service called *Matins,* from L. *matutīnus,* applied to anything taking place early in the morning.

Note 2.—The spelling *Mattins* with the double *t* may be due to the It. *mattino,* or simply to denote that *a* had a short sound.

MAT'IN DOG: large kind of dog, now almost peculiarly French; but supposed to have been introduced into France from n. Europe. It is allied to the Danish dog; has rough hair; a rather flat forehead; a rather pointed muzzle; the ears erect, but bent down at the tips. It is generally of whitish color, clouded with brown. It is fierce, but not very courageous. Buffon, without reason, imagined it the original of many kinds of dog.

MATINÉE, n. *măt'ĭ-nā* [F. *matinée*—from *matin*, the morning]: a reception or musical entertainment held in the daytime. Now applied to an *afternoon* performance.

MATRASS, n. *măt'răs* [F. *matras*, a long narrow-necked bottle]: a chemical vessel in the shape of an egg, with a tapering neck, used for distilling, etc.

MATRICA'RIA. See CHAMOMILE.

MATRICE, n. *mā'trĭs*, MATRICES, n. plu. *mā'trĭ-sēz*. See MATRIX.

MATRICIDE, n. *măt'rĭ-sīd* [F. *matricide*—from L. *matricīdĭŭm*, a matricide—from *māter*, a mother; *cædĕrĕ*, to cut down, to kill: It. *matricidio*]: the murder of a mother; the killer or murderer of a mother. MAT'RICI'DAL, a. *-sī'dal*, pertaining to a matricide.

MATRICULATE, v. *ma-trĭk'ū-lāt* [mid. L. *matricŭlātus*, one entered on the roll—from *matricŭlă*, a roll or register]: to enter, or to admit, into a society or college as a member by enrolling the name in the register—usually restricted to enrolment in a university. MATRIC'ULATING, imp. MATRIC'ULATED, pp.: ADJ. entered or admitted, as a student into a university. MATRIC'ULA'TION, n. *-lā'shŭn*, the act of registering and admitting as a member of a university.

MATRIMONY, n. *măt'rĭ-mŏ-nĭ* [L. *matrimōnĭŭm*, marriage—from *māter*, a mother: It. *matrimonio*]: marriage; the married state; wedlock. MAT'RIMO'NIAL, a. *-mō'nĭ-al* [F.—L.]: of or relating to marriage; conjugal. MAT'RIMO'NIALLY, ad. *-lĭ*.—SYN. of 'matrimonial': nuptial; hymeneal; connubial; spousal.

MATRIX, n. *mā'trĭks*, or MATRICE, n. *mā'trĭs*, MATRICES, n. plu. *mā'trĭ-sēz* [L. *matrix* or *matrīcem*, the womb: It. and F. *matrice*]: the womb; the hollow or cavity in which anything is formed or cast; a mold; in *dyeing*, the five colors, black, white, blue, red, and yellow; in *geol.*, the rock or main substance in which a crystal, mineral, or fossil is embedded.

MATRON, n. *mā'trŏn* [F. *matrone*—from L. *matrōna*, a wife—from *māter*, a mother: It. *matrona*]: a wife; the mother of a family; an elderly married woman; a nurse or female superintendent in an hospital. MATRON-LIKE, becoming a wife or matron; sedate; modest. MA'TRONLY, a. *-lĭ*, motherly; sedate; elderly. MATRONAL, a. *mā'trŏn-al*, of or relating to a mother; suitable to a matron. MA'TRONIZE, v. *mā'trŏn-īz*, to render matron-like; to accom-

pany or superintend as a matron. MA'TRONIZING, imp. MA'TRONIZED, pp. *-īzd.*

MATRONYMIC, n. *măt'rō-nĭm'ĭk* [Gr. *mētēr;* L. *māter,* a mother; and Gr. *onŏma,* a name]: the name of a man or woman derived from that of a mother.

MATROSS, n. *mă-trŏs'* [Dut. *matroos,* a sailor: mid. L. *mattārĭŭs,* one who sleeps on a mat—from L. *matta,* a mat]: in *mil. in India,* one of the soldiers in a train of artillery who assist the gunners and act as guards.

MATSUKATA, MASAYOSHI, *mâ-sī-ō'shē mât-sô-kâ'tâ,* COUNT: Japanese statesman: b. Satsuma 1835. He was a son of a samurai, but fell in with the radical party; was made head of the prefecture (or *ken*) of Hida after the revolution; was prominent in the tax reform of 1875; represented Japan in several industrial exhibitions; was a member of the cabinet, in 1880 as minister of commerce, in 1881 as minister of finance, and, with the same portfolio, as prime minister from 1891 to 1893. His great work was in 1896-7, when he formed a new cabinet, carried through the gold standard, set Japanese credit on its feet, but he was forced to retire in 1898 because of the ill-success of his scheme of taxation. He became minister of finance in October of the same year, but retired in October, 1900. He has written much on Japanese finances.

MATSYS, *mât-sĭs'* (or MASSYS or MESSYS), QUINTIN: artist: 1466-1530; b. Louvain; son of a smith, clock-maker, and architect. At the age of 25, Matsys settled at Antwerp, and became one of the earliest painters of note in that city. His style was somewhat hard, deficient in light and shade, but of great strength in expression. His finish is minute, with superfluous care for jewels and ornaments. His glow of color was often fine. Most of his pictures were religious. The two most celebrated were altar-pieces, now in museums—one at Antwerp, the other at Brussels. Others are in various European galleries.—A Protestant tendency, not fully developed in Matsys, was stronger in some of his kindred: in 1543, for the offense of Bible-reading, his sister Catherine was buried alive in the cathedral square, and her husband was beheaded at Louvain.

MAT'TAWA: a river in Canada, the source of which is Trout Lake, east of Lake Nipissing. It flows east a distance of about 50 miles and enters the Ottawa river at Mattawa. This river forms part of an almost continuous waterway from the Ottawa river to Lake Huron, and before the Canadian Pacific railroad was built this water route was much used for transportation and travel.

MATTEAWAN, *măt-te-a-wŏn':* N. Y., village, in Dutchess county; on Fishkill creek, and on the New York, N. H. & H., and the Newburg, D. & C. railroads; about 45 miles north of New York and 2 miles east of the Hudson river. The first permanent settlement was made in 1804; but there had been trading posts in the

vicinity in the 18th century. Matteawan is in an agricultural region, and has considerable trade in fruit, potatoes, and dairy products. The industrial establishments are hat factories, novelty works, machine-shops, silk mills, coal and lumber yards. The prominent buildings are the State Hospital for the Criminal Insane, New Hospital, Highland Hospital, and the Howland Circulating Library. Pop. (1900) 5,807; (1910) 6,727.

MATTEI, *mât-tā'ē*, TITO: Italian musician and composer: b. Campobasso, Italy, 1841, May 24. He was educated in Naples. He was accorded the degree of professor in Saint Cecilia's Academy at Rome when he was 11 and was also elected a member of the Philharmonic Society in Florence and other cities. He gave his first concert when 15 and afterward made tours of Europe, but in 1863 settled in London and confined his concert tours to Great Britain, and in 1870 he conducted an Italian opera at the Lyceum theatre. He is the composer of hundreds of songs and pianoforte pieces, many of which have become widely popular, and the operas: *Maria di Gand; La Prima Donna;* etc.

MATTER, n. *măt'tėr* [L. *materĭă*, matter or stuff of which anything is made—from *māter*, a mother: It. *materia;* F. *matière*]: that which occupies space; body; that which is visible or tangible; that of which anything is composed; subject; thing treated or spoken of; the whole concern; object; question considered; that about which we think or write; event; business; in *logic*, substantial as opposed to formal truth; cause of disturbance or any event; portion of time or distance, as a *matter* of five miles; in *printing*, set-up type: V. to be of importance; to signify. MAT'TERING, imp. MAT'TERED, pp. *-tėrd.* MAT'TERLESS, a. *-lĕs*, without matter. MATTER OF FACT, a real occurrence; a reality; thing limited to fact, as opposed to a flight of the imagination. NO MATTER, of no consequence or importance. MATTER IN DEED, a matter that may be proved by deed. MATTER OF FACT, a matter that may be referred to a jury, as its truth is a question that may be determined by the senses, or decided upon evidence. MATTER OF LAW, a matter, the truth or falsity of which must be decided by established rules of law. MATTER OF RECORD, matter that may be proved by the production of an authentic record. IT MATTERED NOT, it did not signify; it was of no consequence. WHAT MATTERS IT? of what consequence or moment is it?—SYN. of 'matter, n.': materials; substance; elements; essence; pith; embodiment; affair; importance; difficulty; trouble; manuscript; copy; thing; question.

MATTER, n. *măt'tėr* [F. *matière;* Sp. *materia;* Dut. *materie*, pus; W. *madra*, to fester—connected with F. *maturer;* L. *matūrārĕ*, to ripen, to bring to a head: comp. Gael. *mathair*, pus]: the moisture from a sore; pus: V. in *old* and *prov. Eng.*, to generate pus or matter, as a sore. MAT'TERING, imp. MAT'TERED, pp. *-tėrd.* MATTERY, a. *măt'tėr-ĭ*, full of matter or pus; generating matter.

MATTER: from a physical point of view, anything that can affect the senses, or that can exert, or be acted on by, force. From a philosophical point of view, the existence of matter, in the sense of *substance,* has been doubted by many philosophers. Indeed, as we can know matter only by the forces that it exerts, it has been urged that the supposition of mere geometric points, capable of exerting force (technically called *Centres of Force*), will as satisfactorily account for all observed phenomena as any other idea of the ultimate nature of matter. Here, however, we are dealing with a question confessedly beyond the reach of experiment, and belonging to the domain of metaphysics.

Two essential attributes of matter, according to most philosophers, are extension and impenetrability. This means that two portions of matter cannot occupy the same space at the same time and that all matter occupies some space. Evidently if the conception of matter as simply a name for forces operating at geometrical points in space be accepted, the notion of extension and impenetrability as essential attributes of matter falls away. They then become secondary attributes dependent upon the manner in which we sense the manifestations of matter.

Matter has been conceived as made up of irreducible elementary particles called atoms, which cannot be further divided. Physics and chemistry have employed this conception as a working hypothesis to account for physical and chemical phenomena and on the whole with great success. Today, however, the tendency is to supplant the older spatial conception of the atom with the dynamic conception of forces as indicated in a previous paragraph. In a similar way physico-chemical science has adopted the idea of the molecule as the combination of atoms which cannot be broken up without disturbing the chemical characteristics of the molecular compound. Thus the molecule of water contains two hydrogen atoms and one oxygen atom. When the hydrogen and oxygen are separated, as may be accomplished by many chemical reagents, the molecule is destroyed, although the atoms remain unchanged. The elements of matter are those substances which cannot be decomposed into other simpler substances. The metals illustrate this phenomenon. The number of elements is indefinite and new ones are occasionally found.

See ATOM; ATOMIC THEORY; CHEMISTRY; VORTEX; GASES; FORCE; ETHER OR ÆTHER; ATTRACTION (and references); ELECTRICITY; MAGNETISM; MATERIALISM; MIND; BODY; etc.

MAT'TERHORN. See CERVIN, MONT.

MATTESON, *măt'ĕ-son,* TOMPKINS HARRISON: American artist: b. Poughkeepsie, N. Y., 1813, May 9; d. Sherbourne, N. Y., 1884, Feb. 2. His early lessons in art were from an Indian; otherwise he was mostly self-

taught until after the success of his *Spirit of '76*, when he settled in New York and studied in the National Academy. From 1851 until his death his home was Sherbourne. For a time he was a member of the New York legislature. His themes were historical or from American country life, and his best known pictures are *The First Sabbath of the Pilgrims; Examination of a Witch; Eliot Preaching to the Indians; Rip Van Winkle's Return from the Mountains, At the Stile;* and *Foddering Cattle.*

MATTHEW OF WESTMINSTER: early English chronicler in the reign of Edward II.; of whom nothing is known, except that he was a monk of the Benedictine Abbey of Westminster. His history or chronicle is in Latin, entitled *Flores Historiarum, per Matthæum Westmonasteriensem collecti, præcipue de Rebus Brittanicis, ab Exordio Mundi, usque ad annum* 1307 (Flowers of History gathered by Matthew of Westminster, chiefly concerning the affairs of Britain, from the Beginning of the World to the year 1307). That part which treats of English history from the Conquest to the close of Edward I.'s reign is considered valuable, on account of the manifest diligence, accuracy, and honesty of the writer. The work was printed first 1567, London; again (with additions) Frankfurt 1601. Bohn has published a translation into English (2 vols. 1853).

MATTHEW, *măth'thū*, THE EVANGELIST: an apostle of the Lord Jesus. In the New Testament he appears first as a publican or tax-gatherer at the Sea of Galilee. There is no reason to doubt that Matthew is the same person referred to (Mk. ii. 14; Lk. v. 27, etc.) under the name 'Levi.' Levi seems to have been his original name, which was changed to Matthew. After the ascension of Christ, Matthew is found at Jerusalem; he then disappears from Scripture, and the traditions concerning him are contradictory and of little value. There is no proof of his martyrdom.

MATTHEW, THE GOSPEL ACCORDING TO: one of the canonical books of the New Testament. Its date has been almost universally placed between A.D. 60 and 70. Irenæus places its composition 61; some of the later Fathers as early as 41. The obvious design of the work is to show to the Jews in Palestine the Messiahship of Jesus; hence the frequency of the expression in regard to his acts—'that it might be fulfilled which was spoken by the prophet.' The language in which Matthew wrote his gospel has been a question in controversy. The opinion of the ancient church generally (founded on a passage in Papias, Bp. of Hierapolis, 2d century) was, that Matthew wrote it first in Hebrew—rather in that mixture of Hebrew, Chaldee, and Syriac spoken in Palestine in Christ's time, and known as Aramaic. Erasmus doubted this, and held that Matthew wrote only the Greek gospel which we now possess. His

view was supported by Calvin, Beza, and others of the reformers; and more recently, in some form, by Keim, Alford, Ellicott, Davidson, and the majority of scholars, orthodox and heterodox. Still more recently, the opinion of Bengel, that Matthew wrote first a Hebrew gospel, and then translated it into Greek, has been advocated by Guericke, Olshausen, Schaff, Godet, and other eminent scholars. The passage in Papias is not clear; and some grammarians and biblicists—e.g., Lachmann, Ewald, Meyer, Reuss, and Credner—understand it to mean that Matthew drew up a series of notices of Christ's life and sermons, which were afterward arranged by another writer. The advocates of this view are not numerous. On the whole, the testimony for an original gospel of Matthew is so ancient and so strong, that it seems preferable to consider our Greek as a translation and enlargement of Matthew's original Hebrew work—made probably by Matthew himself. All identifications of this original Hebrew gospel of Matthew with the *Gospel to the Hebrews* (mentioned by Irenæus and translated by Jerome) are fallacious.

The genuineness and canonicity of our gospel of Matthew have been acknowledged in the church, and by heretics, from the earliest times; and this testimony has gathered strength as time has passed. The matter and mode of treatment are less lofty and spiritual than those of Luke and John; and the arrangement is simple, attempting no chronological order, but grouping miracles and events according to the nature of the matter.

MATTHEW PARIS, or MATTHEW OF PARIS. See PARIS, MATTHEW.

MATTHEWS, *măth'ūs* (JAMES) BRANDER, D.C.L., LITT.D., LL.D.: American author, essayist, and dramatist: b. New Orleans, La., 1852, Feb. 1. Graduated from Columbia College, N. Y., 1871, and from its Law School 1873, was admitted to the New York bar, 1873, but applied himself mainly to literature, chiefly in the writing of essays, dramas, fiction, and criticism; in 1892 he was appointed professor of literature at Columbia College, and became professor of dramatic literature 1898; he was a founder of The Players and of the Authors Club, of the Dunlap Society, and of the Columbia University Press, and was prominent in the formation of the American Copyright League and of the Simplified Spelling Board; from 1889-91 he was president of the Nineteenth Century Club. He has contributed largely to monthly and weekly periodicals, and among his published works are the following: *The Theatres of Paris* (1880); *French Dramatists of the Nineteenth Century* (1881); *Margery's Lovers*, a comedy (produced 1884); *The Last Meeting* (1885); *A Secret of the Sea* (1886); *Cheap Books and Good Books* (1888); *American Authors and British Pirates* (1889); *A Family Tree, and Other Stories* (1889); *With My Friends; Tales Told in Partner-*

ship (1891); *In the Vestibule Limited* (1892); *Americanisms and Briticisms* (1892); *The Decision of the Court,* a comedy (produced 1893); *The Story of a Story* (1894); *Studies of the Stage* (1894); *Vignettes of Manhattan* (1894); *This Picture and That* (1894); *His Father's Son* (1895); *Introduction to the Study of American Literature* (1896); *Parts of Speech, Essays on English* (1902); *The Development of the Drama* (1903); *Recreations of an Anthologist; Inquiries and Opinions* (1907); etc.

MATTHEWS, Edmund Orville: American naval officer: b. Baltimore 1836, Oct. 24. He was graduated from the United States Naval Academy in 1855 and served in the navy with several promotions before the outbreak of the civil war, in which he served with distinction. In 1869-73 he was in command of the torpedo boat corps at Goat Island, Newport Harbor, and he commanded the Brooklyn in the Asiatic squadron in 1885-7; he was a member of the board of inspection and survey in 1891-4, and in 1897 was raised to the rank of rear-admiral. He was appointed president of the examining board in 1898 and served until he was retired in that year.

MATTHEWS, Franklin: American journalist: b. St. Joseph, Mich., 1858, May 14. He was graduated from Cornell University in 1883, was reporter and editor on the Philadelphia *Press* 1886-90, and since the last named year has been editor of the New York *Sun.* He has published *Our Navy in Time of War* (1899); *The New-born Cuba* (1899).

MATTHEWS, George: revolutionary soldier: 1739-1812, Aug. 30; b. Augusta county, Va. He rendered important military service against the Indians, and later under Washington in the revolution; was severely wounded and taken prisoner in the battle of Germantown (1777, Oct.); settled in Oglethorpe county, Ga., 1785; was representative in congress 1789-91; governor of Georgia 1793-96; brigadier-general of militia, conducting military operations in Florida, 1811. He died at Augusta, Ga.

MATTHEWS, Stanley: American jurist: b. Cincinnati, Ohio, 1824, July 21; d. Washington, D. C., 1889, Mar. 22. He was graduated from Kenyon College in 1840, studied law and was admitted to the bar in 1842, when he established a practice in Maury county, Tenn., but returned to Cincinnati in 1844 and engaged in practice there. He was editor of the Cincinnati *Herald,* an anti-slavery journal, in 1846-9, and held various political offices, and in 1855-6 was a state senator. In 1858, he was appointed United States district-attorney for the southern district of Ohio, but at the outbreak of the civil war in 1861 entered the volunteer service and was commissioned lieutenant-colonel and was a colonel when in 1863 he resigned to accept the seat of judge of the superior court of Cincinnati. He was elected United

States senator in 1877, after having acted as counsel before the electoral commission, and in 1881 he was appointed a justice of the Supreme Court of the United States.

MATTHIAS, *măth-thī'as:* one of the 70 disciples sent out by the Lord Jesus; after the ascension of Christ, chosen by lot to fill the place vacated by Judas.

MATTHI'AS CORVI'NUS, King of Hungary: 1443, Mar. 27—1490, Apr. 6 (reigned 1458-90); b. Klausenburg, Transylvania; second son of John Hunyady (Corvinus)—see HUNYADY, JANOS. Having been released from the hands of the treacherous Frederick III. of Germany by Podiebrad, King of Bohemia, he returned to Hungary, and was elected king 1458. His ascension was hailed with enthusiasm the country over. But the Hungarian crown at this time was no chaplet of roses; two rulers, alike formidable—one, the Turk, Mohasemed II., from his military talents and immense resources; the other, Frederick III., from his intriguing policy—were busily conspiring against the boy-king. To meet these dangers, Matthias rapidly carried out his measures of defense, the most important of which was the formation of a regular force of cavalry, to form which, one man was enrolled out of every 20 families. This was the origin of the term 'Hussar,' which means in Hungarian 'the price or due of twenty.' Matthias fell on the Turks, who had ravaged the country as far as Temesvar, inflicted upon them a bloody defeat, pursued them as far as Bosnia, took the stronghold Jaicza, where he liberated 10,000 Christian prisoners, and thence returned to Weisenberg, where he was crowned with the sacred crown of St. Stephen 1464. He next suppressed the disorders of Wallachia and Moldavia; but, feeling that his plans were counteracted by the intrigues of Frederick III. to gain possession of Hungary, Matthias besought the assistance of Pope Pius II., but to no purpose. After a second successful campaign against the Turks, he turned his attention to the encouragement of arts and letters, and adorned his capital with the works of renowned sculptors, in addition to a library of 50,000 volumes. He sent a large staff of literary men to Italy for the purpose of obtaining copies of valuable manuscripts, and adorned his court by the presence of the most eminent men of Italy and Germany. Even at the present day, the remains of the celebrated *Collectio Corvina* are eagerly sought after. He was himself an author of no mean ability, and he possessed a delicate appreciation of the fine arts. At the same time, the affairs of government were not neglected. The finances were brought into a flourishing condition, industry and commerce were promoted by wise legislation, and justice was strictly administered to peasant and noble alike. But the promptings of his ambition, and the pressure exercised by the Rom. Catholic party, cast an indelible blot on Matthias's otherwise spotless

escutcheon; he wantonly attacked Podiebrad, his father-in-law, the Hussite king of Bohemia, and after a bloody contest of seven years' duration between these kings, the greatest generals of the age, the Hungarian power prevailed, and Moravia, Silesia, and Lusatia were wrested from Bohemia. Immediately after this war, Matthias went to meet his old enemies, the Turks, and inflicted on them, at Kenyérmezö (1479), a defeat which kept them quiet for the next 46 years. After defeating an invading army of Poles, he had at length a fair opportunity for settling his differences with Frederick, and taking revenge on the insidious plotter who had imbittered his whole life. The Austrian fortresses fell before him in rapid succession. After an obstinate defense, Vienna shared the same fate (1485), and the Austrian emperor was reduced to beg his bread from village to village. Matthias now took up his residence in Vienna, but, while on the pinnacle of glory, he was struck down by a fit of apoplexy, and died at Vienna.

MATTHIESEN (or MATTHIAS), JOHN. See ANABAPTISTS.

MATTIES, n. plu. *măt'tĭz* [Ger. *matt*, of poor quality: Gael. *maith*, having the desired qualities, complete, full: Icel. *máti*, equal]: moderately-sized herrings which have very small milts and roes; the quality of east-coast, Scotch-cured herrings, being young fish in which the roes and milts are not distinctly developed. *Note.—Fulls* are the first quality of east-coast, Scotch-cured herrings, in which the roes and milts are fully developed; *spent fish* are those that, having spawned, have neither milts nor roes.

MATTING, n. See under MAT.

MATTINS, n. plu., for MATINS. See under MATIN.

MATTO, or MATO GROSSO, *mât'tō grōs'sō* (*dense forest*): a state of Brazil, bordering on Bolivia: 532,708 sq.m.; peopled mostly by Indians. Chief rivers, the Madeira, Juruema and Paraguay, with their numerous affluents. Its soil is fertile, but there is almost no cultivation. Dense forests cover immense tracts of the country. Gold and diamonds abound, and indeed the mineral riches of the state have hitherto formed the chief barrier to its progress. Diamonds, gold, hides, balsams, ipecacuanha, and other drugs are the exports. Manufactured goods are imported. Pop. about 93,000.

MATTOCK, n. *măt'tŏk* [Lith. *matikkas*, a grubbing-ax; Serv. *motika*, a hoe; Gael. *madog;* W. *matog*, a pickax]: a kind of pickax having one end flat and the other not pointed; a tool to grub weeds.

MATTOON, *mă-tôn':* Ill., city, in Coles county; on the Illinois C., the Peoria, D. & E., and the Cleveland. C. C. & St. L. railroads; about 75 miles east by south of Springfield. It was settled and incorporated in the year 1855. It is situated in an agricultural region in which

broom corn is one of the principal products. The chief manufacturing establishments are broom factories, flour mills, grain elevators, wagon and carriage factories, foundries, machine-shops, and repair shops for several railroads. It has a large trade in its manufactured articles, grain, fruit, and live-stock. Some of the prominent buildings are the Old Folks' Home (I. O. O. F.), the public and parish schools, the public library and reading room, and the churches. The electric-light plant is owned and operated by the city. Pop. (1910) 11,456.

MATTOON', EBENEZER: patriot, farmer and soldier: 1755, Aug. 19—1843, Sep. 11; b. Amherst, Mass. He graduated at Dartmouth College 1776; entered the revolutionary army for service in Canada; was lieutenant of artillery at battle of Bemis Heights 1777, and later major; became a noted farmer on scientific principles in Amherst; many times member of state legislature; sheriff of Hampshire county 20 years; member of congress 1801-3; major-general state militia 1797-1816; adjutant-general 1816; colonel of the Ancient and Honorable Artillery Co. of Boston 1817; member of state constitutional convention 1820. For more than 26 years before his death at Amherst, he was blind.

MATTRESS, n. *măt'rĕs* [OF. *materas,* a quilted cushion, a mattress—from It. *materazzo*—from Ar. *al matrah* (see MAT)]: a bed stuffed with hair or other soft material, and quilted.

MATTULLA, n. *măt-tŭl'la:* in *bot.,* the fibrous matter covering the petioles of palms.

MATURATE, v. *măt'ū-rāt* [L. *maturātus,* made ripe—from *matūrus,* ripe: F. *maturer,* to ripen]: to ripen; to hasten or promote suppuration; to grow ripe. MAT'URATING, imp. MAT'URATED, pp. MAT'URATIVE, a. *-rā-tĭv,* ripening; conducive to ripeness. MAT'URA'TION, n. *-rā'-shŭn* [F.—L.]: the process of suppurating perfectly; the formation of pus; state of growing ripe; act of ripening. MATURE, a. *mă-tūr',* ripe; arrived at fulness or completion, as of years or growth: well-digested and ready for execution, as a scheme: V. to promote ripeness; to advance toward ripeness or perfection; to become ripe. MATUR'ING, imp. MATURED, pp. *-tūrd'.* MATURE'LY, ad *-lĭ.* MATURITY, *mă-tū'rĭ-tĭ,* or MATURE'NESS, n. *-nĕs,* state of perfection or completeness, as of age or experience; ripeness. MATURITY, n. the time when a bill of exchange becomes payable. MATURESCENT, a. *măt'ū-rĕs-ĕnt* [L. *maturescen'tem,* becoming ripe]: approaching to maturity.—SYN. of 'mature, a.': perfect; completed; ready; digested; prepared.

MATURE, MATURITY. See under MATURATE.

MATUTINAL, a. *măt'ū-tī'năl* [L. *matutīnālis*—from *matutīnus,* in the morning, early: It. *matutino*]: pertaining to the morning; early.

MATZOON′: a milk food used in Armenia; prepared by exposing milk in open vessels to a heat of 90° F., and when coagulation takes place the curd is broken up by a churning process, and a little salt is added.

MAT′ZOTH: the Hebrew name for a kind of unleavened bread or biscuit eaten by the Jews during the feast of the Passover.

MAUBEUGE, *mō-bėzh′:* fortress and manufacturing town of n. France, dept. of Nord, occupying both banks of the Sambre, 142 m. by rail n.e. from Paris, within two miles of the Belgian frontier. The origin of Maubeuge was in a double monastery for monks and nuns founded in the 7th c. Destroyed successively by the Normans, by Louis XI., by Francis I., and by Henry II., it finally fell to France by the treaty of Nimeguen (1678), and was fortified by Vauban. Besides its arsenal and several old convents, Maubeuge has a variety of important industries, as iron foundries, tanneries, and manufactories of firearms and iron and steel goods. It has also an active trade in coal, marble, slate, saltpetre, sugar, and oil. Pop. about 20,000.

MAUCH CHUNK, *mawk-chŭnk:* Pa., a town and county-seat of Carbon county, on the Lehigh river, the Lehigh Coal & Navigation Company's canal, and on the Central of N. J., and the Lehigh V. railroads; 46 miles west by north of Easton. The town is picturesquely built on the side of a mountain rising 1,500 feet from the river, here winding through a narrow, deep ravine, and each summer is visited by thousands of tourists, attracted by the beauty of the surrounding natural scenery. The town has a county building, Y. M. C. A. building, the Dimmick Memorial Library, is electrically lighted, and has electric street railways. It has a number of foundries, shoe factory, car shops, etc., but is best known as an important coal centre, marking the extreme boundary of the anthracite coal region of Pennsylvania; it was established by the Lehigh Coal & Navigation Company in 1818. The Summit Hill coal mines, nine miles southwest of the town, are among the best in the state. The coal is now carried through a tunnel, but was formerly transported to Mauch Chunk by a gravity railroad known as the Switchback, which has become famous as an exciting pleasure route for tourists. Mounts Pisgah and Jefferson, the summits of which are reached by the Switchback railroad; Prospect Rock, Flagstaff Peak, and Glen Onoko are points of considerable interest, commanding splendid views of the Lehigh valley. Pop. 4,690.

MAUD, n. *mawd* [Scot. *maad* or *maud*]: a wrapping plaid or shawl made of undyed wool; a gray-striped plaid worn by shepherds in the s. of Scotland.

MAUDLIN, a. *mawd′lĭn* [corrupted from *Magdalen*, who is drawn by painters with swollen eyes and dis-

ordered look: OF. *Magdalcine*]: crying or sentimentally drunk; fuddled; approaching to intoxication; stupid.

MAUDSLEY, *mawdz'lĭ*, HENRY, M.D., LL.D.: English physician and physiologist: b. Giggleswick, Yorkshire, 1835, Feb. 5; graduate in med. of the Univ. of London 1856; resident physician to lunatic asylum Manchester 1859-62; and from 1862 settled in London as consulting physician on mental disease. He became professor of medical jurisprudence in the Univ. of London 1875; also consulting physician W. London Hospital; and editor of the *Journal of Medical Science*. He has published *Physiology and Pathology of the Mind* (1867); *Body and Mind* (1870); *Responsibility in Mental Disease* (1874); *Natural Causes and Supernatural Seemings* (3d ed. 1897); *Life in Mind and Conduct* (1902); *Shakspeare: Testimonied in his own Bringings Forth* (1905); etc.

MAUDUIT, *mō-dwē'*, ISRAEL: English sympathizer with the Amer. revolution: 1708—1787, June 16; b. Exeter, England. He was educated as a dissenting minister, but became a successful merchant with his brother Jasper, for whom he acted as agent in England of the province of Mass. from 1763. He became collector at Southampton 1765, and in the next ten years wrote several pamphlets urging upon the British public and govt. the justice of the colonial cause. At a later date he became an advocate of Amer. independence.

MAUGRE, prep. *maw'gėr* [F. *malgré*, against the will —from *mal*, ill; *gré*, will]: in spite of; in opposition to; notwithstanding.

MAU'I. See SANDWICH ISLANDS.

MAUKIN, n. *maw'kin*. See MALKIN.

MAUL, n. *mawl* [F. *mail*, a mall, a hammer—from L. *mallĕŭm*, a hammer]: a heavy wooden hammer; also written MALL.

MAUL, v. *mawl* [Icel. *mal;* Ger. *mahl*, a mark, a stain: prov. Eng. *mawl*, to cover with dirt: comp. Gael. *meall*, a lump, a bunch]: to disfigure by ill-usage; to hurt coarsely or roughly. MAUL'ING, imp.: N. a rough beating, as with a cudgel. MAULED, pp. *mawld*.

MAULE, *mow'lā:* province of s. Chili, between the Andes and the Pacific; having a line of coast mountains on the w., and many hills in its e. part, while centrally it is a region of plains, very rich in pasturage for cattle, and highly cultivated, with a temperate climate, and abundant production of wheat, corn, barley, and vegetables, besides wines, salt, and cheese. From the hills is brought valuable timber for ship-building, a principal industry on the coast. The Maule river, the n. boundary, is navigable 30 m. from the sea, but for small vessels only, on account of the bar at its mouth and its numerous rapids. Its waters supply many irrigating canals, and

furnish power for flour mills. The largest port is Constitucion.

MAULMAIN'. See MOULMEIN.

MAUL-STICK, n. *mawl'stĭk* [Ger. *maler-stock*, a maulstick—from *malen*, to paint, and Eng. *stick*]: the stick on which an artist rests and steadies the hand while painting; also written MAHL-STICK.

MAUMEE RIVER, *maw-mē':* stream formed by the union at Ft. Wayne, Ind., of the St. Mary's and St. Joseph's rivers, and flowing thence about 100 m. across the n.w. corner of Ohio to the w. extremity of Lake Erie, which it reaches through Maumee Bay. Below the rapids which end 12 m. above its mouth, it is practically a part of the bay and lake, with width of one-third mile to one mile, and channel 12 to 30 ft. deep. Toledo, now an important commercial port and great railway centre, is four m. above its mouth. The rapids are 18 m. long. Between Toledo and the rapids are many low islands. The stream is liable to great variation in volume of water, and the spring freshets are sometimes tremendous. The Maumee is navigable to S. Toledo, 8 m. above Toledo, and in high water to Defiance, 42 m. farther.—MAUMEE BAY is a small, shallow body of water between North Point and Cedar Point, 7 or 8 m. in length, and about the same in width, with low, marshy shores which are a favorite resort for water-fowl, and therefore for duck-hunters. The channel through it, from the lake to Maumee river, is crooked, but has been much improved by the United States govt. in recent years; its depth is 12 to 14 ft.

MAUNA KEA, *mow'nâ kā'â:* volcanic mountain in Hawaii, about 14,000 ft. high. See SANDWICH ISLANDS; HAWAII.

MAUNA LOA, *mow'nâ lō'â* ['long or high mountain']: a volcanic mountain of Hawaii, the chief of the Sandwich Islands. It is notable among mountains of such great height for being entirely the result of the outpour from the earth of highly fluid lava, which has flowed out very widely and formed an elevation of 13,760 ft., with slope so gentle as to give a regular dome, up whose sides forest and other vegetation reaches to the height, in different places, of 5,000 to 10,000 ft., while the summit is usually clad with snow. Its immense breadth occupies a large part of the central and s. regions of the island, and its top is sometimes seen at sea from a distance of 53 leagues, the most remarkable instance known of the distant visibility of a mountain. Numerous craters of enormous size are on its sides or near its summit, and new ones open with fresh eruptions. The terminal crater, KILAUEA, with a breadth of 8,000 ft., extended by depressions, in a n. and s. direction, to 13,000 ft., is over 1,000 ft. deep, and has nearly perpendicular walls. Nothing can exceed the grandeur and terror of its eruptions, taking the form of immense fountains of glowing, fiery

lava, from the top and sides of the mountain. 1859, Feb., the display of white-hot fluid lava lasted four or five days. 1868, Apr., the hot lava forced its way underground 20 m., and broke out through a fissure two miles long. A continuous fiery fountain a mile long was observed, formed by separate fountains uniting, and the crimson lava and red-hot rock were thrown to the height of 500 or 600 ft., taking a rotary motion, uniformly toward the south. In 1881, an outburst lasted 9 months, forming a river of lava, which spread at times to 3 m. in width, and extended 50 m. from its source.

MAUND, n. *mawnd* [F. *mande* or *manne*, an open basket: Fris. *maujnn*, a turf or wood chest: W. *mawn*, turf]: a hand-basket; a round hamper without a cover. *Note.*—MAUND and MAUNDY are very probably connected. The broken food for the poor was placed in *maunds*—that is, baskets provided for containing the *mandate* bread for the poor: in *slang*, MAUND is 'to beg.' See MAUNDY.

MAUND, n. *mawnd* [Hind. *man*]: in *East Indies*, a weight: varying in different localities.

MAUNDER, v. *mawn'dėr* [Bav. *maudern*, to murmur: Scot. *maunt*, to mutter: Gael. *manndach*, stuttering]: to mutter; to grumble; to wander in talking. MAUN'DERING, imp. MAUN'DERED, pp. *-dėrd.*

MAUNDRIL, n. *mawn'drĭl:* in *coal-mining*, a pick with two shanks.

MAUNDY, a. *mawn'dĭ* [F. *mandé*, a doublet of F. *mandat*, a mandate, an order: OF. *mande*, that which is commanded—from L. *mandātum*, that which is commanded, a command, being the first word of the L. sentence, *Mandatum novum do vobis*]: in the Rom. Cath. Church, the name applied to the office appointed to be read during the ceremony of washing the feet of poor persons, in imitation of our Lord when he washed his disciples' feet after supper, saying *Mandatum novum do vobis*—'a new commandment I give to you.' MAUNDY THURSDAY, in *Eng.*, Thursday in Holy Week (q.v.); the day before Good Friday. The name is derived from *mandatum*, the first word of the service chanted at the washing of the feet of pilgrims on that day (from John xiii. 34). The washing of the pilgrims' feet is of very ancient usage, being referred to by St. Augustine; and in ancient and modern times, it was accompanied by a distribution of 'doles,' which were handed to the pilgrims in small baskets, thence called 'maunds.' The distribution of doles was retained till 1838, since which period the 'Maundy' men and women receive a money-payment from the clerk of the almonry office instead of it.

MAUPASSANT, *mō-pa-sŏng'*, HENRI RENÉ ALBERT GUY DE: French novelist: b. Chateau Miromesnil, Seine-Inferieure, France, 1850, Aug. 5; d. Paris, 1893, July 6. He began his career as a clerk in the navy department

in Paris and also served for a time in the French army during the Franco-Prussian war. The novelist Flaubert, a friend of his mother's, was his godfather, and the youth took him as his model in the art of composition. After years of practice, during which he wrote and destroyed a great number of manuscripts, he allowed a short story, *Boule de Suif*, to appear in 1880, a work which displayed the greatest finish and at the same time allied him to the naturalistic school of fiction. In the same year he published a book of verse, *Des Vers*, and a drama, *Histoire du vieux Temps*. After this he continued to cultivate the short story and was very soon recognized as one of the greatest writers of short stories the 19th century had seen. In spite of the perfection of art displayed in their construction neither his brief tales nor his novels form pleasant reading. They compel admiration, but they are dominated by pessimism and in his later work the traces of an unbalanced mind may be plainly seen. In 1892, De Maupassant's mental malady occasioned the cessation of literary occupation, two years later he became wholly insane, and he died the next year in an asylum. His collections of short stories include: *La Maison Tellier* (1881); *Mlle. Fifi* (1883); *Les Sœurs Rondoli* (1884); *Yvette* (1884); *Contes du Jour et de la Nuit* (1885); *Contes et Nouvelles* (1885); *La Horla* (1887); *La petite Roque* (1888); *La Main gauche* (1889); *Le Père Milon; L'inutile Beauté* (1890); etc. The finest of his six novels is *Pierre et Jean* (1888); the others are: *Une Vie* (1883); *Bel Ami* (1885); *Mont Oriol* (1887); *Fort comme la Mort* (1889); *Notre Cœur* (1890). He also published several collections of travel sketches, such as *Au Soleil* (1884); *Sur l'Eau* (1888); *La Vie errante* (1890). A collection of 13 of his short stories published in English with the title *The Odd Number* represents him at his best, both in point of art and as regards the stories themselves. The absence of a moral sense is less apparent here than elsewhere and there is less of gloom and animalism perceptible.

MAUPERTUIS, *mō-pĕr-tû-ē*, Pierre Louis Moreau de: French mathematician and philosopher: b. St. Malo, France, 1698, Sep. 28; d. Basel, Switzerland, 1759, July 27. He entered the army in 1718 and after five years' service resigned in order to become instructor in mathematics in the Academy of Sciences. He went to England in 1728, where he was made a member of the Royal Society, and became a pupil of Newton. In 1736 he conducted a scientific expedition to Lapland for the purpose of measuring an arc of the meridian, the result of which was a confirmation of Newton's theory of the flattening of the globe at the poles. In 1743, he was elected to the French Academy, in 1744 was summoned to Prussia by Frederick the Great, and in 1746 was declared president of the Academy of Sciences at Berlin. A dispute with the philosopher König regarding the discovery of the

infinitesimal calculus shortened his days. Among his works are: *Sur la Figure de la Terre* (1738); *Discours sur la Figure des Astres* (1742); *Maupertiana ou divers Ecrits* (1753). Consult: De la Baumelle, *Vie de Maupertuis* (1856); Damiron, *Memoires sur Maupertuis* (1858).

MAUREL, *mō-rĕl*, VICTOR: French singer: b. Marseilles, 1848. He was educated at the Paris Conservatoire and made his début in Paris in 1869. His first appearance in Royal Italian Grand Opera was in 1873 and he achieved a signal success. He created Iago in Verdi's *Otello* and has appeared in many operatic roles in Europe and the United States, being generally recognized as the leading acting baritone actor on the Italian stage.

MAUREPAS, *mō-rė-pâ*, JEAN FRÉDÉRIC PHÉLYPEAUX, COMTE DE: French statesman: b. Versailles, 1701, July 9; d. there, 1781, Nov. 21. He became minister of state under Louis XV. in 1738, but in 1749 was banished the court for an attack on Mme. Pompadour. In 1774, he was made prime-minister by Louis XVI. The chief events of his administration were the restoration of the Parliament of Paris (1774, Nov. 12), and the alliance with and assistance of the American colonies in their struggle against Great Britain. Consult: Guyot, *Eloge Historique de M. de Maurepas* (1782).

MAURETA'NIA. See MAURITANIA.

MAURICE, *maw'rĭs*, Prince of Orange and Count of Nassau: one of the most skilful and distinguished generals of his age: 1567, Nov. 14—1625, Apr. 23; b. Dillenburg; son of William I., Prince of Orange. After his father's assassination 1584, the provinces of Holland and Zealand, and afterward Utrecht, elected him their stadtholder or governor. A great portion of the Netherlands was still in the hands of the Spaniards; but under the admirable leadership of Maurice the Dutch rapidly wrested cities and fortresses from their enemies. In 1591, Zutphen, Deventer, Nimeguen, and other places fell into their hands; 1593, Gertruydenberg; and 1594, Gröningen. In 1597, with the help of some English auxiliaries, Maurice defeated the Spaniards at Turnhout in Brabant, and in 1600 won a splendid victory at Nieuport. Finally, 1609, Spain was compelled to acknowledge the United Provinces as a free republic. The ambition of Maurice, however, was excited to the desire of sovereignty; but in this, notwithstanding the love and respect of the people, he finally failed. See BARNEVELDT. He died at the Hague.

MAU'RICE, Duke and Elector of Saxony: 1521, Mar. 21—1553, July 11; b. Freiberg; eldest son of Duke Henry of the Albertine line (see SAXONY), and nephew of Duke George (q.v.) the Bearded, the most bitter opponent of the Reformation. He espoused, 1541, Agnes, daughter of the Landgraf Philip of Hesse; and later, in the same year, succeeded his father in the duchy of

Saxony and its dependencies. He was scarcely established in his dominions when a dispute arose between him and his cousin, the Elector John Frederic, regarding their respective rights over the bishopric of Meissen, the common property of the Ernestine and Albertine lines; but by the influence of Luther and of the Landgraf Philip, temporary reconciliation was effected. Maurice took part in the campaign of 1542 against the Turks in Hungary, and the emperor on his return gave him to a command in the armies on the w. frontier of Germany. Maurice also insisted on obtaining the protectorate of the bishopries of Magdeburg and Halberstadt, in recompense of his services; a stipulation to which Charles would not consent. Maurice accordingly returned to his duchy, and though still on the most friendly terms with the emperor, took part in the deliberations of the Prot. League of Schmalkald (q.v.), being himself a professed Protestant, and the son-in-law of one of the chiefs of the League. He refused, however, though agreeing with the objects of the League, to become a member; and the judicious gift to him by the emperor of the much-coveted protectorate above mentioned, and subsequently (1546, June 19) a solemn deed of the emperor at Ratisbon, by which the Ernestine portion of Saxony and the electoral title were transferred from John Frederic to Maurice, secured the latter's energetic support. When Charles, at the commencement of the war, was cooped up in s. Germany by the army of the League, Maurice, by invading the Saxon electorate, compelled the Protestants to retire northward, thus relieving the emperor, and enabling him to subdue Swabia and the Upper Rhine districts. But by this maneuver he drew an overwhelming attack upon himself, and was driven by the incensed John Frederic from the electorate, deprived of his own dominions, and reduced to extremity. At this critical moment, the emperor came to his aid; and Maurice and the Duke of Alva (see ALBA), at the battle of Mühlberg, annihilated the elector's army, and took him prisoner. Maurice was now, in accordance with the previous agreement, ruler of the whole of Saxony, with the electoral dignity; and friendly relations with the emperor became more dependent on the course of events. The retention in confinement of Philip of Hesse, whom Maurice had induced to submit to the emperor, was the first cause of estrangement; the attempts of the emperor to increase his own preponderance in Germany supplied another; and though the new elector zealously supported the Interim (q.v.) of Augsburg 1547, he gradually came to see that his close alliance with the emperor was alienating from him the affections of his Prot. subjects. He accordingly at once abandoned the cause of the emperor, and, with the princes of Kulmbach and Hesse, secretly sent (1551, May) agents to Paris and London to negotiate an alliance against Charles V., while he leisurely carried on the

siege of the rebellious city of Magdeburg as pretext for keeping an army afoot. The manifesto, or rather ultimatum, of the Prot. princes, in which they demanded the release of Philip of Hesse, and the total abolition of the arbitrary authority of the imperial government; and the capture by them of Augsburg, while their allies, the French, took Metz, placed Charles in a precarious position. A secret flight from Innsbruck appeared open to him; but he had gone only as far as Füssen (a town on the Lech, on the borders of Bavaria and the Tyrol), when the news that Maurice was marching in this direction forced him to hasten again to Innsbruck. Apr. 18, by the mediation of Ferdinand, King of the Romans, a treaty was concluded at Linz granting the demands of the Protestants; but as it was not to take effect till May 26, Maurice attacked (May 18) the camp of Reitti, defeated and wholly dispersed the imperialists, and advanced on Innsbruck with the view of taking Charles captive, when his progress was stopped by a mutiny in his army; and the emperor escaped. Finally, at a convocation of the electors and princes of the empire at Passau, the terms of a treaty of peace were discussed, Maurice directing the cause of the Protestants, and Ferdinand attending to the imperial interests, and it was ultimately agreed that Protestants were free to exercise their worship; that the imperial chamber, from which Lutherans were not to be excluded, should render justice irrespective of religion; and that the Aulic Council should be composed exclusively of German ministers. These conditions, which in political matters secured 'Germany for the Germans,' and in religious affairs permanently established the principles of toleration, were embodied in the agreement called the *Peace of Passau* (1552, Aug. 22). The bitter dislike conceived by the emperor toward Maurice, on account of these transactions, prompted him to entertain the idea of deposing him from the electorate, and reponing John Frederic; of which scheme, Maurice being apprised, he, with his usual subtlety and address, patched up a reconciliation with the emperor, and went to take part in the campaign of 1553 against the Turks, who were gradually gaining ground in Hungary. Returning soon, he found that one of his former allies, Albert, Markgraf of Kulmbach, had refused to accede to the treaty of Passau, and continued the war on his own account, making raids on the ecclesiastical princes of the Rhine and Franconia. So, about midsummer of 1553, Maurice, putting himself at the head of 20,000 men, marched to protect his bishopric of Magdeburg against the ecclesiastical spoliator, and falling in with him at Sievershausen, completely defeated him July 9, but received in the conflict a bullet-wound which proved fatal two days later.

MAU'RICE, Count of Saxony (MARSHAL SAXE). See SAXE, HERMANN MAURICE.

MAURICE.

MAU'RICE, JOHN FREDERICK DENISON, D.D.: clergyman of the Church of England, and one of the leading thinkers of his age: 1805, Aug. 29—1872, Apr. 1; son of a Unitarian minister. His reputation at Cambridge University for scholarship stood high, but being at this time a dissenter, and otherwise not in a position to sign the Thirty-nine Articles, he left Cambridge without taking a degree, and commenced a literary career in London. He wrote a novel, *Eustace Conyers*, and for a time edited the *Athenæum*, then recently started. Soon a change came over his religious sentiments and opinions; his spirit was profoundly stirred and influenced by the speculations of Coleridge, and he resolved to become a clergyman of the Church of England. He went to Oxford, where he took the degree M.A., and was ordained priest 1834. He became chaplain to Guy's Hospital 1837; professor of literature at King's College, London, 1840; and was professor of theology there 1846-53. The aim of his life was the interpretation of Christianity in accordance with the most pure and spiritual conceptions of our nature; and his labors in this direction have had results deep and far-reaching. Carlyle records John Sterling as 'going to Guy's' Sunday after Sunday. At the time of his death, there was probably no clergyman in the United Kingdom more deeply reverenced and loved than he was by a large body of the thoughtful and cultivated portion of the religious laity. He also gathered round him, *within* the church, a large number of adherents, especially among the younger clergy, who constitute what is commonly called the 'Broad Church' party (a name which deeply distressed Maurice, who sought to found no party), though its members repudiate any sectional tendency, and do not associate to carry out any sectional schemes, like the 'Evangelicals' and Tractarians. His regular congregation was never large: his work was that of a teacher of teachers. Maurice's theological opinions, especially on the question of the atonement, are not considered 'sound' by the 'orthodox' portion of the clergy; and the publication 1853 of a volume of *Theological Essays*, in which, among other heresies, he took the charitable view of future punishments, lost him the professorship of theology in King's College, London. For many years Maurice was chaplain of Lincoln's Inn, and 1860 he was appointed incumbent of the district church of Vere street, Marylebone. He was always a warm and enlightened friend of the working-classes, and founded the first Working-man's College in London. Maurice became professor of moral philosophy at Cambridge 1866. He wrote largely. All his works are written in exquisite English, and evince a beauty and tenderness of Christian sentiment nearly faultless, but united with a subtlety of thought that frequently passes into mysticism. This last element probably prevents his writings from being generally popular: they appeal to an unusual order of mind. As to his

personal character it has been well said—'Those who were privileged to know him did not know a more beautiful soul.' His principal productions are his *Mental and Moral Philosophy, Religions of the World, Prophets and Kings of the Old Testament, Patriarchs and Lawgivers of the Old Testament, The Kingdom of Christ, The Doctrine of Sacrifice, Theological Essays, Lectures on the Ecclesiastical History of the First and Second Centuries, Gospel of St. John,* and *Social Morality.* Maurice strenuously controverted Mansel's views on our knowledge of God. He was the mainspring of a movement known as Christian Socialism; helped to promote the Working-man's College; and was the founder and guiding spirit of the Queen's College for Women, in which he taught. See the *Life of F. D. Maurice,* based mainly on his own letters, by his son, Col. Maurice (2 vols. 1884).

MAURICIUS, *maw-rĭsh'ĭ-ŭs,* FLAVIUS TIBERIUS, *flā'-vĭ-ŭs tī-bē'rĭ-ŭs* (MAURICE), Byzantine Emperor: about 539—602, Nov. 28 (reigned 582—602); b. Arabissus, in Cappadocia; of Roman descent. In 578, Mauricius was appointed by Tiberius II. to command the army against the Persians. In 582, he obtained the rare honor of a triumph at Constantinople, and the same year succeeded Tiberius on the throne. He married the emperor's daughter Constantina. Immediately after his accession, the Persians invaded the Byzantine territories; and a fierce contest through eight years resulted, chiefly because of the internal convulsions that distracted Persia, in favor of the Byzantines. The king of Persia, Khusru (or Chosroes) II., driven from his throne, fled to Hierapolis, whence he sent to Mauricius a letter beseeching shelter and aid. The emperor's generous nature was not proof against such an appeal; an army was immediately assembled, to which the loyal Persians flocked from all quarters; and 591, Khusru was restored to his throne, giving up to Mauricius, in evidence of his gratitude, the fortresses of Dara and Martyropolis, the bulwarks of Mesopotamia. Some time after these events, a war broke out with the Avars; and after two years of bloody conflict, with little gain to either side, the Byzantines suffered a severe defeat, and 12,000 veterans were taken prisoners. Mauricius refused to ransom them, and they all were consequently put to death. Mauricius's conduct has been satisfactorily accounted for (see Gibbon's *Decline and Fall*), but it excited a deep and lasting resentment among the people and the army; and in 602, when the emperor ordered his troops to take up their winter-quarters on the north (or Avarian) side of the Danube, they broke out into open revolt, elected a centurion, Phocas, for their chief, and marching upon Constantinople, which had declared against Mauricius, raised Phocas to the throne. Mauricius, who had abdicated and

retired to Chalcedon, was pursued and taken, and, with his five sons and many of his friends, was put to death.

MAURIST, n. *mawr'ĭst* [L. *Maurus*, the name of the favorite follower of St. Benedict]: member of the Congregation of St. Maur, to whom literature owes the stately tomes known as Benedictine Editions. See BENEDICTINES.

MAURITANIA, *maw-rĭ-tā'nĭ-a*, or (properly) MAURETA'NIA: ancient name of the most n.w. part of Africa, corresponding in its limits to the present sultanate of Morocco (q.v.) and western Algiers, though its limits varied much. It derived its name from its inhabitants, the *Mauri* or *Maurusii* (see MOORS). It reached on the s. to the Desert, and was separated from Numidia on the e. by the river Mulucha or Molochath, now the Muluya. A large portion was very fertile.

MAURITIA, *maw-rĭ'shĭ-a:* genus of palms, having male flowers and female or hermaphrodite flowers on distinct trees, imperfect spathes, and fan-shaped leaves. They all are natives of the hottest parts of America. Some of them, like the Buriti (q.v.) Palm (*M. vinifera*), have lofty, columnar, smooth stems, others are slender, and armed with strong, conical spines. The MIRITI Palm (*M. flexuosa*) grows to the height of 100 ft.; it has very large leaves on long stalks. The stem and leaf-stalks are used for various purposes. A beverage is made from the fruit, as from that of the Buriti Palm and several other species.

MAURITIUS, *maw-rĭsh'ĭ-ŭs*, formerly ISLE OF FRANCE: island of the Indian Ocean, belonging to Great Britain; 550 m. e. of Madagascar, 115 m. n.e. of the island of Réunion; lat. 19° 58′—20° 33′ s., and long. e. from Greenwich 57° 17′—57° 46′; 36 m. long, 23 m. broad; about 713 sq.m. Pop. (1901) 378,195, giving a very high average to the square mile. Of the total pop. about two-thirds were estimated to be Indian coolies. The surface is of varied formation, a great portion being volcanic; while its coast is fringed by extensive coral reefs, pierced in several places by the estuaries of small streams. Its mountains, though of no great height, are marked by the usual irregularities of volcanic formations. Of these, the most celebrated is the Pieter Botte, 2,676 ft. high, in the rear of the town of Port Louis, and forming a remarkable obelisk or cone sustaining on its apex a gigantic piece of rock, which has the appearance of being poised upon its summit with the nicest precision. In the island are remains of several small craters, and traces of lava are numerous. The principal towns are Port Louis, the capital, and Grande Port, or Mahébourg, the s. port, the latter difficult of access for shipping and encumbered with coral reefs. Port Louis comprises a spacious harbor, and is provided with an inner basin, denominated the Fanfaron, wherein vessels can take refuge during the

violent cyclones which occur here. There is also a slip upon which large vessels can be raised for examination and repair.

Mauritius produces annually much sugar, which it exports to England, France, and Australia. The nature of the soil, however, in many parts prevents a universal development of this culture. In some districts, considerable tracts of cane-growing land are encumbered with large bowlders; in many places, these have been collected into rough walls, between which the canes are planted, while in others their size precludes removal. The method in the cultivation of the cane is similar to that in the W. Indies; but the bulk of the sugar is ultimately shipped in bags composed of the leaf of the Vicona palm. The climate of this island is remarkably fine, except that it is very hot in summer. There are four seasons: the high temperature is in Nov., Dec., and Jan. Throughout the year the thermometer ranges from 76° to 90° in the shade. In some of the interior elevated districts, however, the climate resembles that of the hills of India, or in s. France. The s. portion of the island, called La Savanne, is exceedingly beautiful, and diversified with mountain and ravine, clothed with luxuriant wood. The mountains themselves are bold and fantastic, with every possible outline. There are two lines of railway (110 miles), accompanied by telegraph lines. Some much-needed sanitary measures have been carried out. Roads have been made, bridges built, and light-houses have been erected off Grande Port. At Port Louis are spacious docks. Hospitals have been founded, and the establishment of savings banks has proved beneficial. In 1868, Mar., the island experienced a most calamitous hurricane; and during three or four years previous to 1870 a fearful epidemic raged. The governor of Mauritius is assisted by an executive council of 5 members, and a legislative council of 17. The imports are chiefly live-stock, rice, guano, grain, wine, machinery; the exports mainly sugar, with some rum and copper.

Mauritius was discovered 1505, by the Portuguese commander, Don Pedro Mascaregnhas, and was subsequently visited by the Dutch under Van Neck 1598, who gave the island its present name in honor of Prince Maurice. The Dutch formed a settlement here 1644, but abandoned it. A new and more successful attempt at permanent establishment was made by the French 1721, already in possession of the adjacent island of Bourbon, who renamed it 'l'Ile-de-France.' Mauritius remained in French hands until near the close of 1810, when it was taken by the British in an expedition under Gen. Abercromby, and has since remained a British possession. Mauritius was the habitat of the Dodo (q.v.).

MAUROCORDATOS, *maw-ro-kor-dâ'tos*, or MAVROCARDATO, *mâv-ro-kâr-dâ'to:* Fanariote family, distinguished for ability and political influence; descended from mer-

chants of Chios of the Genoese family of Scarlati.—ALEXANDER MAUROCORDATOS, professor of medicine and philosophy in Padua, became dragoman or interpreter to the porte 1681, plenipotentiary of the porte in the negotiations for peace at Carlovicz 1699.—NICHOLAS MAUROCORDATOS, the first Greek who was Hospodar of Moldavia and Wallachia.—CONSTANTINE MAUROCORDATOS, brother of Nicholas, became Hospodar of Wallachia 1735, abolished slavery in that country, and introduced the culture of maize.—ALEXANDER, Prince Maurocordatos, 1787—1865, Aug.; b. Constantinople; grandson of Constantine Maurocordatos, was active in the Greek contest for independence, prepared the declaration of independence and the plan of a provisional government, was elected president of the executive body; and being appointed commander-in-chief, undertook, 1822, an expedition to Epirus, which ended in the unsuccessful battle of Peta; but he delivered the Peloponnesus by his bold and resolute defense of Missolonghi 1823. Notwithstanding violent political strife in which he was unfortunately involved, he was able afterward to render important services to his country—e.g., by the heroic defense of Navarino and Sphacteria. He was a steadfast admirer of English policy and institutions. After the accession of King Otho, he was at different times cabinet minister and ambassador at different courts.

MAURY, *maw'rĭ*, MATTHEW FONTAINE, LL.D.: naval officer, astronomer, and hydrographer: 1806, Jan. 14—1873, Feb. 1; b. Spottsylvania county, Va. In 1825, he was appointed midshipman in the U. S. navy, and during a four years' cruise round the world, in the *Vincennes* frigate, commenced a treatise on navigation, which was adopted as a text-book in the navy. In 1836, he was made lieutenant; but being lamed by an accident, and unfitted for service afloat, he was appointed to the hydrographical office at Washington. Here he carried out a system of observations which enabled him to write his *Physical Geography of the Seas,* and to produce 1844 his works on the Gulf Stream, Ocean Currents, and Great Circle Sailing. He projected the maritime conference at Brussels 1853; and with the co-operation of the British govt., and assistance by observations and reports from naval officers and sea-captains, completed his sailing charts, to the great advantage of the commerce of the world. His model log-books were adopted in the meteorological office of the English Board of Trade, which was established by reason of them. In 1855, he was promoted to the rank of commander, and published *Letters on the Amazon and Atlantic Slopes of South America.* At the outset of the civil war 1861, Maury took a command in the Confederate navy; and, having lost all his possessions, retired to England, where a large sum of money was presented to him by subscription. Maximilian, then claiming power in Mexico, appointed him imperial com-

missioner of emigration. At Maximilian's death Maury returned to Virginia, where he died. Maury's services to meteorology and *practical* navigation were very great: his theories in *Physical Geography* are no longer generally accepted.

MAUSER, *mow'zĕr*, PAUL: German inventor and gunmaker: b. Oberndorf-on-the-Neckar, 1838, June 27. He worked as a boy in the royal armory at Oberndorf, and there with his brother Wilhelm (b. 1834, May 2; d. 1882, Jan. 13) patented several improvements on the small arms then in use, both new needle-guns, and a model replacing the 'needle' powerful percussion-pin. The introduction of the Prussian needle-gun into Würtemberg after the Austro-Prussian war deprived the brothers of the patronage of the government, and in 1867 he settled in Liège. Paul invented the Mauser revolver in 1879, having returned to Oberndorf in 1874. The 'Mauser, 1882,' was adopted by the Servian government in 1882. After that date he made the Turkish model in 1887, the Belgian repeating rifle in 1889, the Argentine model in 1891, the Spanish model in 1893 (adopted with slight change throughout South and Central America), and in 1896 a rifle for the Swedish army. The German models of 1898 and 1871-84 are largely due to him. Typical of his rifles are the Belgian model of 1889 and the Argentine of 1891, both magazine rifles with no cut-off, but capable of single fire by replacing the top cartridge in the magazine after each discharge. The magazine holds five cartridges, lies in front of the trigger guard and under the receiver, is fixed in type but easily cleaned. The gun can be charged through the receiver with one cartridge or the five from the magazine may be stripped together from a metal clip, independently of the mechanism of the magazine, and pushed to the right on the closing of the bolt.

MAUSOLEUM, n. *maw'sō-lē'ŭm* [from the gorgeous tomb of *Mausōlus*]: a stately tomb or monument. MAU'SOLE'AN, a. *-lē'ăn*, pert. to a mausoleum. A *Mausoleum* is a large sepulchral monument containing a chamber in which urns or coffins are deposited. The name is derived from the tomb erected at Halicarnassus to Mausolus, King of Caria, by his disconsolate widow, Artemisia, B.C. 353. It was one of the most magnificent monuments of the kind, and was esteemed one of the seven wonders of the world. It was described by Pliny and other ancient writers, as late as the 12th c., and must have been overthrown, probably by an earthquake, during the following two centuries, for all trace of it had disappeared, except some marble steps, when the Knights of St. John of Jerusalem, 1404, took possession of the site of Halicarnassus, then occupied by a small village called Cleesy. While excavating among the ruins for building materials, the knights discovered a large chamber decorated with marble pilasters, and with richly inlaid panels. The sar-

cophagus of the founder was also discovered in another great hall. Excavations have been recently made by Newton, assisted by the British govt., and he has succeeded in bringing to light many of the beautiful sculptures of the Mausoleum; among others, the fragments of the statue of King Mausolus (now pieced together in the British Museum), and a portion of the Quadriga which crowned the monument. Many fragments of lions, dogs, etc., and a beautiful sculpture of a horse, have been found; also portions of friezes, of fine design and workmanship, the subjects of which invariably are Greeks in conflict with Amazons. The plan of the basement has been traced, the area being 126 ft. by 100 ft., and from the fragments of columns, Ionic capitals, etc., which have been found, the description of Pliny has been verified. The Mausoleum consisted of a basement 65 ft. high, on which stood an Ionic colonnade 23½ ft. high, surmounted by a pyramid, rising in steps to a similar height, and on the apex of which stood a colossal group, about 14 ft. in height, of Mausolus and his wife in the Quadriga; these statues are supposed to be the work of the celebrated Scopas. The above dimensions, from Newton's restoration, are disputed by Mr. Fergusson and others; but all agree that the total height, 140 ft., given by Pliny is probably accurate.

MAUVAISES TERRES, *mō-vāz-tār'* [Fr. Bad Lands]: general name for peculiarly worthless tracts; usually bare of vegetation, treeless, and desolate; though sometimes affording a little pasturage in the rainy season. The underlying rock is usually tertiary, and fossil remains of mammals abound. One of the chief regions of Mauvaises Terres is that on the White river, a branch of the Mo. river. Other examples are in Colorado, Nebraska, Dakota, and other western parts of the United States.

MAUVE, n. *mōv* [F. *mauve*—from L. *malva*, a mallow, the petals of which have purple markings]: purple dye obtained from aniline, one of the constituents of coal-tar. Mauvine, a. *mōv'ĭn*, pert. to the color mauve.—See Dyestuffs.

MAVERICK, n. *măv'ėr-ĭk* [named after a Mr. *Maverick*, a large cattle owner, who neglected to brand his yearlings, whence they were called Mavericks]: in Texas, an unbranded yearling, especially one appropriated by a chance finder. This term, in common use in the cattle country of the United States, is said to be derived from the name of Samuel Maverick, a Texas lawyer and politician, who, having accepted a herd of 400 head of cattle in payment of a debt, left them in charge of one of his men. They were neglected and allowed to run wild, and when the calves were born they were of course appropriated by other ranchers and branded with their marks, and so passed to their undisputable ownership. As the ownership of the cattle was determined by the brand, it

may easily be seen why the name 'Maverick's' was given to all calves caught straying from the herd. From this use of the word grew a wider application to anything dishonestly come by.

MAVIS, n. *mā'vĭs* [F. *mauvis;* OF. *malvis,* the mavis —from mid. L. *malvitĭŭs*—from L. *malum,* bad, destructive; *vitis,* a vine]: in *Scot.,* a bird, also called the song-thrush—so named from being destructive to vines; the red-wing.

MAVOR, JAMES: English political economist: b. Stranraer, Scotland, 1854, Dec. 8. He was graduated from the University of Glasgow. He was for a time editor of the *Scottish Art Review;* was university extension lecturer on political economy; in 1888 became professor of political economy at Saint Mungo's College, Glasgow, and in 1892 professor of political economy and constitutional history at the University of Toronto, Canada. He has written: *Wages, Theories and Statistics* (1888); *Economic Theory and History Tables and Diagrams* (1890); *Scottish Railway Strike* (1891); *Currency Reform* (1891); *Economic Study and Public and Private Charity* (1892); *English Railway Rate Question* (1894); has edited *Handbook of Canada* for 1897; and has prepared reports on *Labor Colonies in Germany* (1893); *Immigration into Canada from Europe* (1900); *Workmen's Compensation Acts* (1900); *Papers on Municipal Affairs* (1904); etc. He has been interested in the currency question and has served as vice-president of the Bimetallic League.

MAVROCORDA'TO. See MAUROCORDATOS.

MAW, n. *maw* [Dut. *maag;* Icel. *magi;* Ger. *magen;* O.H.G. *mago,* the stomach; Fin. *mako,* stomach; *maku,* taste]: the stomach, used only of animals, except in contempt; the craw of a fowl. MAW'-SKIN, n. stomach of a calf prepared for making cheese rennet. MAW'-WORM, a worm that infests the stomach and bowels.

MAWKISH, a. *mawk'ish* [Scot. *mauk,* a maggot: Sw. *mask;* Norw. *makk,* a grub, a worm: Icel. *madkr,* a maggot—*lit.,* maggoty, then loathesome]: apt to cause satiety or loathing; disgusting; insipid; affectedly; sentimental. MAWK'ISHLY, ad. *-lĭ.* MAWK'ISHNESS, n. *-nĕs,* aptness to cause loathing.

MAWMET, n. *măw'mĕt* [a corruption of *Mahomet*]: in *OE.,* an idol; a puppet—so named by Christians of the middle ages from the fact of *Mahomet* being the object of their detestation. MAWMETRY, n. *maw'mĕt-rĭ,* the religion of Mahomet; idolatry.

MAW-SEED: name for Poppy-seed (*Papaver somniferum*) sold as food for cage-birds. Maw-seed is given to birds especially when moulting.

MAX, GABRIEL VON: one of the most remarkable of modern painters: b. Prague, 1840, Aug. 25; second son of Joseph Max (sculptor, d. 1855); of mingled German and Czech (Bohemian) parentage. Max gained distinc-

tion and fame first by his *Crucified St. Julia.* He is pre-eminent among painters as a poet of deep, tender, and genuine feeling, with extreme fertility of imagination, and refined vigor and breadth in execution. His *Frühlingsmärchen* or *Spring Tale* was awarded a gold medal at the Vienna Exposition 1873, and sold the next year for 15,250 marks. His *Light,* also at the Vienna Exposition, representing a blind girl sitting at the extrance of the catacombs offering to each comer a lighted lamp, is among his most remarkable productions. No more notable picture was seen at the Paris Exposition 1878, than Max's *Christ Awakening the Little Daughter of Jairus from Death,* now in the Metropolitan Museum, New Yerk. The number and variety of Max's productions are large. He was ennobled in 1900.

MAXEN'TIUS, Marcus Aurelius Valerius, Roman emperor 306-312. See Constantine I., the Great.

MAXILLA, n. *măks-ĭl'lă,* Maxil'læ, n. plu. *-lē* [L. *maxilla,* a jaw]: one of the jaw bones; specifically the upper jaw, the lower jaw being called the mandible; a jawbone; among articulate animals, the lower pairs of horizontal jaws. Maxillar, a. *măks'ĭl-lėr,* or Maxillary, a. *măks'ĭl-lėr-ĭ* or *măks-ĭl'lėr-ĭ,* pertaining to the jaw or jawbone. Maxilliform, a. *măks-ĭl'lĭ-fawrm* [L. *forma,* shape]: jaw-shaped.

MAXILLIPED, n. *măks-il'lĭ-pĕd* [L. *maxilla,* a jaw; *pedem,* a foot]: a jaw-foot; the footlike appendage of the mouth of a crab or lobster behind the maxillæ.

MAXIM, n. *măks'ĭm* [F. *maxime;* Sp. *maxima,* a maxim —from mid. L. *maxĭma,* with *sententia,* the greatest sentiment or sentence—that is, the weightiest]: a leading or established truth; an adage; a proverb.—Syn.: aphorism; apothegm; saying; axiom; by-word; saw; truism; principle.

MAX'IM, Sir Hiram Stevens: American inventor and engineer: b. Sangersville, Me., 1840, Feb. 5. He was apprenticed to a carriage-maker in his youth; after several years in a machine-shop in Fitchburg, Mass., where he perfected his knowledge of mechanical engineering and drawing and supplemented his scanty education, he went to Boston as foreman in a factory of philosophical apparatus. From Boston he went to New York as employee of the Novelty Iron Works and Shipbuilding Company; took out patents for an automatic gas machine in 1867, and in 1877 for an incandescent electric light which would burn a month and a half. At about the same time he designed a process for flashing electric carbons and another for 'standardizing' them. In 1881-2 he utilized the force of a gun's recoil to reload the gun and fire 770 shots a minute. The Maxim-Nordenfelt Company, combining Maxim's machine-gun patents with those of Nordenfelt, was formed in 1888, and reorganized in 1897 as Vickers Sons and Maxim. His other pat-

ents are for various smokeless powders and several motors, mostly driven by petroleum. Of late much of his time has been spent in studying aeronautics. He became an English subject because of the alleged unfairness toward him of the United States government, and in 1901 was knighted by Queen Victoria.

MAXIM, HUDSON: inventor, mechanical engineer: b. Orneville, Me., 1853, Feb. 3. Left school at 25 years of age, after completing his academic studies at Kent's Hill, Me., where he paid special attention to chemistry, engineering and the natural sciences. In 1875 he formulated the hypothesis of the compound nature of so-called atoms, which has become a generally accepted theory only within the past few years as a result of experiments on radiant matter. Mr. Maxim's theory was published in the *Scientific American Supplement* in 1889. His theory was that all matter is one in the ultimate and that the different forms of matter and the manifestations of force are due to the difference in the relative positions of the ultimate atoms.

He engaged as printer and publisher of subscription books, Pittsfield, Mass., 1883. Of one book, of which he was the author, entitled *Penwork Self-Instructor*, nearly 500,000 copies were sold. While in Pittsfield he invented a process for printing in colors, which was tried in the *Evening Journal* of that city. This was probably the first daily newspaper issued in colors.

Since 1888 he has been engaged as inventor and manufacturer of torpedoes and explosives; was the first maker of smokeless powder in the United States and the first to submit samples to the United States government for trial. Built dynamite factory and smokeless powder mill at Maxim, N. J. (named for him), 1890. Sold smokeless powder inventions to E. I. duPont de Nemours & Co., Wilmington, Del., 1897, and since then has been consulting engineer and expert in experimental department of that company. Joint inventor (with Dr. Robert C. Schüpphaus) of the Maxim-Schüpphaus smokeless powder, adopted by the United States government. Invented and sold to the United States government in 1901 the formula of Maximite (q.v.), which was the first high explosive to be fired through heavy armor plate. Invented process of making calcium-carbide by electric incandescence of a molten carbide conductor, now in general use, and sold invention to Union Carbide Co. Has for past eight years experimented with the Hudson Maxim automobile torpedo, driven by a new self-combustive material of his own invention, which he has named 'motorite.' Inventor of process and apparatus for manufacturing multi-perforated powder grains; improvements in smokeless powder grains; safety detonating fuses for high explosive projectiles, and numerous other inventions; has 50 or more United States patents now pending.

MAXIMA AND MINIMA: in mathematics: values of a varying quantity at which it ceases to increase and begins to decrease, or ceases to decrease and begins to increase. These need not necessarily be the greatest or least values of the quantity concerned. Problems in maxima and minima are sometimes treated by algebra, but usually require the methods of the calculus for their solution. For example, if it be required to cut from each corner of a rectangular sheet of pasteboard (sides a and b) a square of side x such that the remaining sheet shall fold into a box of maximum contents, we have for the contents of the box $x\ (a-2x)\ (b-2x)$ or $4x^3 - 2(a+b)\,x^2 + a\,b\,x$. The derivative of this expression is $12\,x^2 - 4\,(a+b)\,x + a\,b$, and for a maximum, or minimum, this must be 0. Hence

$$x = \tfrac{1}{6}\,(a+b \pm \sqrt{a^2 - a\,b + b^2}).$$

If, for example, $a = 15$ and $b = 8$, we have $x = 6$ or $1\frac{2}{3}$, but the former value is rejected as physically impossible; $x = 1\frac{2}{3}$ gives a maximum.

MAXIMIANISTS, n. *măks-ĭm'ĭ-an-ĭsts:* in *chh. hist.*, sect of Donatists (q.v.). They derived their name from Maximianus, their leader.

MAXIMIA'NUS (or Maximian I.), Marcus Aurelius Valerius—surnamed Herculius, Roman emperor 286-305. See Diocletianus.

MAXIMIA'NUS (or Maximian II.), Galerius Valerius, Roman emperor 305-311: usually called Galerius (q.v.).

MAXIMILIAN, n. *măks-ĭ-mĭl'yan* [named after King *Maximilian*]: a Bavarian gold coin, value $3.24.

MAXIMILIAN, *măks-ĭ-mĭl'yan,* Ger. *mâk-sē-mē'lē-ân,* I., Roman emperor: one of the most distinguished of the German emperors: 1459, Mar. 22—1519, Jan. 12; (emperor 1493-1519); b. Neustadt, near Vienna; son and successor of Frederick III. In his 19th year he married Maria, only child and heiress of Charles the Bold, Duke of Burgundy, and was soon involved in war with Louis XI. of France, who attempted to seize some of her possessions. Maximilian, though successful in the field, was compelled, by the intrigues of Louis in the Netherlands, and disaffection stirred up there, to betroth his daughter, Margaret, four years old, to the Dauphin, afterward Charles VIII.; and to give Artois, Flanders, and the duchy of Burgundy as her dowry. In 1486, he was elected king of the Romans. Insurrections in the Netherlands, encouraged and supported by France, occupied much of his time, and again involved him in war with Louis XI. He afterward repelled the Hungarians, who had seized great part of the Austrian territories on the Danube; and the Turks, who 1492 invaded Carinthia, Carniola, and Steiermark. He again took up arms against France, because Charles VIII. sent back his daughter, and married Anne of Bretagne, in order to acquire that

great province. A peace was however concluded at Senlis 1493, Maximilian receiving back the provinces which he had given with his daughter. On the death of his father 1493, he became emperor; and subsequently married Bianca Sforza, daughter of the Duke of Milan. He applied himself with wisdom and vigor to the internal administration of the empire, took measures for preservation of peace in Germany, and encouraged arts and sciences. But he was soon again involved in wars against the Swiss, the Venetians, and France. He sought to put a stop to French conquests in Italy, and was at first successful; but after various changes of fortune, and years of war, mingled with many political complications, he was compelled to give up Milan to France, and Verona to the Venetians. Nor was Maximilian more successful against the Swiss, who 1499 completely separated themselves from the German empire. The hereditary dominions of his house, however, were increased during his reign by several fortunate additions; the marriage of his son Philip with the Infanta Juana, and of his daughter Margaret with the Infant Juan of Spain, led to the subsequent union of Spain with Austria; while the marriage of two of his grandchildren with the son and daughter of Ladislaus, King of Hungary and Bohemia, brought both these kingdoms to the Austrian monarchy. Maximilian died at Wels, in Upper Austria. He was of chivalrous character. He wrote various works on war, gardening, hunting, and architecture, some poems, and an autobiography full of marvels.

MAXIMILIAN II., Joseph, King of Bavaria: 1811, Nov. 28—1864, Mar. (reigned 1848-64); son of Ludvig I. He married 1842 Princess Maria Hedwig, cousin of William I., German emperor. Until 1848 he took no part in political affairs, but busied himself in agricultural and other improvements, and in literature and science. In that year of revolutionary excitement, he was suddenly called to the throne, on his father's abdication, and adopted a policy accordant with the liberal tendencies of the time. Reactionary measures were afterward to some extent adopted; but Maximilian's reign was signalized chiefly by the encouragement of science. He was regarded with no favor by the ultramontane party; but without respect to their opposition, he brought to Munich men of liberal opinions, eminent in literature and science.

MAXIMIL'IAN (Ferdinand Maximilian Joseph), Archduke of Austria (Emperor in Mexico 1864-67): 1832, July 6—1867, June 19; b. Vienna; second son of Archduke Francis Charles of Austria, and younger brother of Francis Joseph I. Maximilian, who received a careful education, was very popular as governor of the Lombard-Venetian kingdom. In 1862, Napoleon III. of France deemed his way open—by reason of the rebellion in the United States—to interfere in the affairs of

Mexico (q.v.), and in 1863 called together an assembly of notables. This body decided in favor of monarchy; and a deputation was appointed to offer the crown of Mexico to Maximilian. After deliberation he solemnly accepted it; and 1864, June, he entered Mexico. He was of course warmly welcomed by the clergy and the army; but he soon found that they expected him to sanction abuses which he felt bound to condemn; though he gained the support of the liberals. He was supported by French troops; and for a time all went well; but he vainly tried to reconcile Mexican parties, who had no other object in view than power and place. A proclamation that he was induced to make 1865, Oct., threatening death under the laws of war to all who offered resistance to the government (asked for merely to suppress brigandage), was so employed both by the imperialist and French commanders that under it many estimable liberal officers were cruelly shot as robbers. Juarez and his followers again raised the standard of independence. At the same time Louis Napoleon had to contemplate the necessary withdrawal of his troops. In vain Empress Carlotta, daughter of Leopold I. of Belgium, went to Europe to enlist support for her husband; her reason gave way under continued disappointment, grief, and excitement. The French were most anxious that Maximilian should leave with their troops; and it had become evident that abdication was the only course open to him; still he felt bound as a man of honor to remain, and share the fate of his followers. At the head of 10,000 men he made a brave defense of Queretaro against a liberal army under Escobedo. 1867, May 15, he attempted to escape through the enemy's lines, but was captured. The liberal minister of war ordered Maximilian and Generals Miramon and Mejia to be tried by court-martial; and it was in vain that the European ministers protested against this breach of the laws of civilized warfare. The course of the trial was determined from the first; the charges rested chiefly on the proclamation above referred to and the executions which had followed it. July 19, the three prisoners were shot. After some delay, the body of Maximilian was given up to his relatives, and was conveyed to Europe in an Austrian frigate, and interred at Vienna in the imperial vault. After the death of Maximilian his papers were published under the title of *Aus Meinem Leben; Reiseskizzen, Aphorismen, Gedichte,* etc. (7 vols. 1867).

MAXIMITE: a high explosive employed as a bursting charge for projectiles, invented by Hudson Maxim (q.v.). The secret of the invention, and the exclusive right to the use of the explosive, was purchased by the United States government in 1901, after very exhaustive trials at Sandy Hook proving grounds. Maximite was the first high explosive to be successfully employed as a bursting charge for armor-piercing projectiles. This explosive,

while it is claimed to be 50 per cent. more powerful than ordinary dynamite, is so insensitive that it will not only safely withstand the shock of discharge from the gun, but will also stand the far greater shock of penetrating armor-plate as thick as the projectile containing it is capable of passing through, the projectile being then exploded immediately behind the plate with a delay action detonating fuse.

Ignited in the open, maximite simply burns like pitch. Projectiles are charged with it by the simple process of melting and pouring, the explosive solidifying on cooling, and adhering firmly to the walls of the shell. Maximite is known to be a picric acid compound.

MAXIMUM, n. *măks'ĭ-mŭm* [L. *maximum*, the greatest]: the greatest number, quantity, or degree attainable in any given case; opposed to *minimum*, the smallest; the highest price as fixed by some law or regulation: ADJ. the greatest. MAXIMIZE, v. *măks'-ĭ-mīz*, to carry up to a maximum. MAX'IMIZING, imp. MAX'IMIZED, pp. *-mīzd*.

MAX'WELL, *măks'wĕl*, AUGUSTUS EMMETT: American jurist: b. Elberton, Ga., 1820, Sept. 21; d. Shipley, Fla., 1903, May 5. He was educated in Alabama and in the University of Virginia; settled in Tallahassee, Fla., in 1845; was a member of the state legislature, then secretary of state, and later attorney-general; was elected to Congress in 1853, serving until 1857; and from 1862 to 1865 was a member of the senate of the Confederate States, of which, with the exception of ex-Senator Vest, he was the last survivor. After the war he was judge of the supreme court of Florida (1866), circuit judge (1877-85), and chief justice of the state (1887-91).

MAXWELL, Sir HERBERT EUSTACE, F.R.S., LL.D., 7TH BARONET OF MONTEITH: Scottish author: b. Edinburgh 1845, Jan. 8. He was educated at Oxford, was junior lord of the treasury 1886-92, and is president of the Society of Antiquaries of Scotland. Among his many publications are: *Noontide Essays* (1892); *Scottish Land Names* (1894); *Rainy Days in a Library* (1896); *Sixty Years a Queen* (1897); *Life of the Duke of Wellington* (1899); *Memoirs of George Romney* (1902); *The Creevy Papers* (1903); *British Fresh-Water Fishes* (1904); etc.

MAXWELL, JAMES CLERK: Scottish natural philosopher: b. Edinburgh 1831, Nov. 13; d. Cambridge, England, 1879, Nov. 5. He was educated at Edinburgh and at Trinity College, Cambridge, and in 1856 was appointed professor of natural philosophy in the Marischal College, Aberdeen, and held that office till its amalgamation with King's College to form the University of Aberdeen in 1860, when he was appointed to a similar chair in King's College, London. In 1857 he obtained the Adams prize at Cambridge for an essay *On the Stability of Motion of Saturn's Rings*. From 1855 to 1872 he published his investigations on *Perception of Color, and*

Color Blindness, which obtained for him the Rumford medal and his election as F.R.S. He resigned his chair in 1865, and in 1871 was elected unopposed to the newly founded chair of experimental physics at Cambridge. He directed the formation of the Cavendish laboratory founded by the Duke of Devonshire and opened in 1874. In 1871 he published his *Theory of Heat*, which has gone through several editions. In 1873 appeared his great work, *Electricity and Magnetism*. Maxwell's fame will rest on his being the one who took the first grand step toward the discovery of the true nature of electrical phenomena. He rejected the theory of electrical 'action at a distance,' and sought to explain all electrical and magnetic phenomena as the results of local strains and motions in a medium whose contiguous parts only act on one another by pressure and tension. His scientific papers have been collected by W. D. Niven (1890). Consult: Campbell and Garrett, *James Clerk Maxwell* (1882); Glazebrook *James Clerk Maxwell and Modern Physics* (1896).

MAX'WELL, WILLIAM: revolutionary soldier: about 1735—1798, Nov. 12; of Irish origin. He served in the English army in America as early as 1758, to the close of the French war (1765), and during the greater part of the Revolution. He was in the expedition of 1776 to Canada as colonel commanding a New Jersey battalion; was made brigadier-general by Congress 1776, Oct. 23; took part in the battles of Brandywine and Germantown, commanding a New Jersey brigade; was in the pursuit of Clinton; had a prominent part in the battle of Monmouth; shared in the expedition of Sullivan against the New York Indians 1779; was in the battle of Springfield 1780, June 20.

MAY, v. *mā* [Goth. *magan;* Icel. *mega;* Sw. *ma*, to be able]: an auxiliary verb expressing liberty, desire, or wish; to be able; to be free to act; to be possible, as it *may* be so; to be permitted or allowed; to be by chance, as how old *may* he be. MAYBE, perhaps; by chance. MIGHT, pt. *mīt*.

MAY, n. *mā* [Lat. *Maius*, probably from a root *mag*, or Skr. *mah*, to grow]: fifth month of our year; third of the old Roman calendar; so named as being the month of growth. It comprises 31 days. The derivation of the name from Maia, mother of Mercury, is not tenable, for the name was in use among the Romans before they knew anything of either Mercury or his mother. MAY'-ING, n. a celebration of May 1. MAY-BLOSSOM or -FLOWER, in England, the hawthorn-flower: in the United States the trailing arbutus (see EPIGÆA REPENS). MAY-BUG, the chafer. MAY-DAY, first day of May. MAY-DEW, dew gathered on May-day. MAY-DUKE, variety of cherry. MAY-FLY, fly appearing in May (see EPHEMERA). MAY-MORN, freshness; vigor. MAY-POLE, a pole round which dances are held on May-day. MAY-QUEEN, girl crowned

with flowers on May-day.—*May* has been generally regarded as a time for gladness. The outbreak into new life and beauty which marks nature, instinctively excites. The first emotion is a desire to seize some part of that profusion of flower or blossom which spreads around, to set it up in decorative fashion, and to let the pleasure which it excites find expression in dance and song; and among pagans the tendency has been to render to this vegetative trophy a sort of homage. Among the Romans, the feeling of the time found vent in their *Floralia*, or Floral Games, which began Apr. 28, and lasted a few days. May 1—MAY-DAY—was the chief day in the ancient and more modern festival. Among the old Celtic peoples, a festival called *Beltein* (q.v.) also was held on this day, but it does not seem to have been connected with flowers. In England, as we learn from Chaucer and other writers, it was customary, during the middle ages, for all, both high and low—even the court itself—to go out on the first May morning at an early hour 'to fetch the flowers fresh.' Hawthorn (q.v.) branches also were gathered; these were brought home about sunrise, with accompaniments of horn and tabor, and all possible signs of joy and merriment. The people then proceeded to decorate the doors and windows of their houses with the spoils. By a natural transition of ideas, they gave the hawthorn bloom the name 'the May'; they called the ceremony 'the bringing home the May'; they spoke of the expedition to the woods as 'going a-Maying.' The fairest maid of the village was crowned with flowers as the 'Queen of the May'; placed in a little bower or arbor, where she sat in state, receiving the homage and admiration of the youthful revellers, who danced and sang around her. This custom of having a May queen seems a relic of the old Roman celebration of the day when the goddess Flora was specially worshipped. How thoroughly recognized the custom had become in England may be illustrated by the fact that in the reign of Henry VIII. the heads of the corporation of London went out into the high grounds of Kent to gather the May—the king and his queen, Catharine of Aragon, coming from their palace of Greenwich, and meeting these respected dignitaries on Shooter's Hill. But perhaps the most conspicuous feature of these festive proceedings was the erection in every town and village of a fixed pole—the May-pole—as high as the mast of a vessel of 100 tons, on which, on May morning, they suspended wreaths of flowers, and round which the people danced in rings nearly the whole day. A severe blow was given to these merry and often wild revels, by the Puritans, who caused May-poles to be uprooted, and a stop put to all their jollities. They were, however, revived after the Restoration, and long held their ground; but they have now almost disappeared. In France, Germany, and other countries, May-poles were common, and

festive sports are even yet observed.—In the Roman Catholic church, May is known as 'the month of Mary,' being dedicated to the Virgin mother.—See Chambers' *Book of Days*, I. 569-582.

MAY, Edward Harrison: American artist: b. London, England, 1824; d. Paris, France, 1887, May 17. He came to America when a boy, studied civil engineering, and then devoted himself to painting, working first under Daniel Huntington in New York and then under Couture in Paris. He painted portraits and historical and genre subjects; and his best pictures are the portraits of Laboulaye (1866), in the Union Club, New York, and Anson Burlingame (1869); and *The Dying Brigand* (1855), now in the Philadelphia Academy of Fine Arts; *Milton Dictating to His Daughters;* and *Mary Magdalene at the Sepulchre.*

MAY, Georgiana Marian Craik: English novelist: b. London, England, 1831, Apr.; d. St. Leonard's Sussex, 1895, Nov. 1. She was a daughter of G. L. Craik and was married to A. W. May. Her principal novels, which are concerned mainly with domestic life, are: *Riverstone* (1857); *Lost and Won* (1859); *Winifred's Wooing* (1862); *Mildred* (1868); *Sylvia's Choice* (1874); *Hilary's Love Story* (1880); *Godfrey Helstone* (1884); *Patience Holt* (1891); *Dorcas; Only a Butterfly; Anne Warwick.*

MAY, Phil: English illustrator: b. Leeds 1864, Apr. 22; d. Camden Hill 1903, Aug. 5. He was son of an engineer; had his schooling in Leeds; was apprenticed there to a lawyer, whom he soon left to joint a company of players; for them he designed posters; and in 1884 and 1885 began drawing for *Society* and *St. Stephen's Review.* After his marriage he went out to Sydney, Australia, where he gained some fame as artist of the *Bulletin,* and was forced by the exigencies of newspaper illustration to a very scanty use of line and a complete omission of anything else. In 1887 he went to Paris; returned to his work on *St. Stephen's Review;* then began to draw for *Graphic,* traveling through America; and shortly after Du Maurier's death was taken on the staff of *Punch.* He must rank with Leech, Tenniel, and the other great British caricaturists. His art was remarkably simple and telling, his method, it is said, being to reduce an elaborate and detailed drawing to the fewest possible lines. He was particularly happy in his portrayals of London street-life, which are full of humor and sympathy; his parliament sketches are only less felicitous and the likenesses in them are excellent. His own hatchet face, 'banged' hair, and ever-present cigar figure in many of his sketches. From 1892 to his death he published *Phil May's Annual.* His other collections of drawings are: *Parson and Painter* (1891); *Phil May's Sketch Book* (1896), and *Phil May's Gutter-Snipes* (1896).

MAY, Samuel: American reformer and Unitarian clergyman: b. Boston, Mass., 1810, Apr. 11; d. Leicester, Mass., 1899, Nov. 24. He was graduated from Harvard in 1829, and from the Harvard Divinity School in 1833. In 1834 he became pastor of the Unitarian Church at Leicester, Mass., but when his strong abolitionist views became unacceptable to his parishioners, he resigned (1846). He was secretary of the Massachusetts Anti-Slavery Society from 1847 to 1865, and secretary of the American Anti-Slavery Society for several years, and was continually active in the abolition movement. After the Civil war he interested himself in many other reforms, and in 1875 was elected to the state legislature. He was a frequent contributor to the *Liberator* and *Anti-Slavery Standard;* and published *The Fugitive Slave Law and Its Victims.*

MAY, Samuel Joseph: Unitarian preacher and anti-slavery philanthropist: 1797, Sept. 12—1871, July 1; b. Boston. A graduate of Harvard, 1817, and of the Cambridge Divinity School, he was ordained, Boston, 1822, Mar. 14, and settled over a Unitarian church in Brooklyn, Conn.; heard, and was converted by, Garrison's earliest anti-slavery lectures in Boston 1830, Oct. 14, 15, and 18; assisted, 1831, Nov. 13, to found the New England Anti-Slavery Society; was a member 1833, Dec. 4-6, of the convention at Philadelphia which formed the American Anti-Slavery Society and signed its 'Declaration of Sentiments'; 1835-36 lectured as agent of the Massachusetts Anti-Slavery Society; became pastor in S. Scituate, Mass., 1836; took leading part in a peace convention, Boston, 1838, but could not sign the non-resistance 'Declaration;' 1842 took charge of Massachusetts State Normal School at Lexington; three years later became pastor of Unitarian church in Syracuse, N. Y., and there resided until his death. On account of feeble health he resigned his ministry 1868, but continued active as a missionary in central New York. His participation in the rescue of the slave 'Jerry,' at Syracuse 1851, Oct. 1, led to the finding of an indictment against him at Auburn, N. Y. His bail-bond was signed by Wm. H. Seward, and no trial was had. During the Civil war May was conspicuous in labors for the Union soldiers. He was throughout life a most earnest, judicious, and effective supporter of all charitable, educational, and reform movements; a man of warm sympathies and unfailing cheerfulness; just, brave, and gentle. At his death in Syracuse, Jews, Roman Catholics, and every Protestant denomination, paid public tribute to his Christian excellence. He published *Recollections of the Anti-Slavery Conflict.*

MAYA, *mâ'yâ:* in the Purânic mythology of the Hindus, femininely personified will or energy of the Supreme Being, who, by her, created the universe; and as, in this later doctrine, the world is unreal or illusory, Maya as-

sumes in it the character of Illusion personified. In this sense, Maya occurs also in the *later* Vedânta philosophy, and in some of the sectarian philosophies of India.

MAY'-APPLE. See PODOPHYLLUM.

MAYAS, *mâ'yas* or *mī'as*, THE: an Indian race of Yucatan, the peninsular southeastern extremity of Mexico, formerly, with the kindred Quiché people, a widespread family, with a civilization which rivalled the culture of the Peruvian, Azetc, and Toltec peoples. The older views, and to some extent the later (Charnay), treat the Maya culture and monuments as of Toltec origin; but against this conclusion stand too many evidences of the antiquity and independent origin of the Maya-Quiché civilization. The entire northern section of Yucatan was once the Maya seat of empire, and the home of a flourishing civilization, systematically watered by artificial lakes and underground reservoirs, rivalling the water supply systems of Peru, Egypt, and Babylon.

Merida, present capital of Yucatan, stands on the ruins of one ancient city, with those of seven others about it, in the northwestern corner of the peninsula. One of these, Mayapan, the greatest Maya city, had been overthrown a hundred years before the Spanish conquest by the revolt of feudatory states. Of such ruined cities more than 60 are known, almost unexampled monuments of a dead and buried civilization.

Fully five-sixths of the population of Yucatan are of nearly pure Maya stock. They show coarse black and straight hair, arched noses, and reddish-brown complexion, as in other American Aborigines, but are distinguished from all other Indians by their regular features, low cheek-bones, small mouth and ears, straight jaws, frank expression, and an air of refinement indicating a highly cultured ancestry (Keane), a race rivalling, in build, intelligence, and expression, most of the rural classes of Europe (Charnay). Since a general uprising of the mass of the natives (1846), the ruling classes, putting down the revolt by Mexican aid (1847-53), have joined with Mexico, while large numbers of the ruder natives maintain, on the coast lands beyond the Sierra Alta, a savage independence, and make ravaging expeditions northward. They are ruled by a queen who resides at Chan Santa Cruz, not far inland from Belize. Although fast relapsing into heathenism, they keep some vestiges of Christian ceremony, especially reverence for the cross. Spanish iconoclastic zeal nearly destroyed the Maya literature, but a Spanish *Relacion* of the conquest period has been found (1865), and with some relics of the language, letters, and religion of old Maya days, a considerable study is now possible of the most remarkable known Indian race.

MAY BEETLE, or JUNE BUG: popular names for the clumsy brown beetles of the genus *Lachnosterna*

(family *Scarabæidæ*) common throughout the United States. The adults fly by night during late spring and often are troublesome upon the young foliage of trees and shrubs. They are attracted by light and may be trapped in this way. The larvæ are large, brown-headed, white-bodied grubs which feed upon the roots of grass, etc., passing one or more years in the ground. For this reason strawberries and other crops which they attack should not be planted upon freshly turned sod land. Late fall plowing is often practiced to destroy them.

MAY-BIRD: a gunner's name for various shore-birds which return from the South in the month of May, especially the knot. In New England the black-bellied plover, and in the South a curlew, are called May-birds or May-cocks.

MAYENCE'. See MAINZ.

MAYENNE, *mâ-yĕn'* (Lat. *Meduana*): river in northwestern France, which rises in the department of Orne, and after being joined on the right by the Varenne, Calmont, Ernée, and Oudon, on the left by the Jouanne and Ouette, debouches at Pont de Cé into the Loire under the name of the Maine, having become navigable 50 m. s. of Mayenne.—This river gives its name to the department of Mayenne.

MAYENNE': department in northwestern France, formed from the western part of the old province of Maine and the northern of Anjou; 1,990 sq.m. Mayenne, included almost entirely within the basin of the Loire, has a mild climate, but only a partially productive soil, being occupied in many districts by extensive sandy heaths. The chief branches of industry are breeding of cattle and sheep, and rearing of bees; while the iron mines and marble quarries of the district employ the poorer classes. The linen, hemp, and paper manufactures are of some importance. Mayenne is divided into three arrondissements, Laval, Château-Gontier, and Mayenne. Pop. (1901) 313,103.

MAYER, *mā'ėr*, ALFRED MARSHALL: American physicist: b. Baltimore 1836, Nov. 13; d. Maplewood, N. J., 1897, July 13. He studied at St. Mary's College, Baltimore; spent two years in a machine-shop and draughting-room; specialized in chemistry and physics; became professor of these branches in the University of Maryland (1856), and in Westminster College, Fulton, Mo. (1859); after two years of study in Paris, was appointed to a chair in Pennsylvania College, Gettysburg (1865); went thence to Lehigh University in 1867; and from 1871 to his death was professor of physics in Stevens Institute, Hoboken, N. J. There he made important researches in acoustics; invented the topophone, an apparatus to detect the phases of sound vibration; discovered five methods of analysis of compound sounds into their elementary tones; and stated the law of tuning-fork vibration. He wrote

many papers for the *American Journal of Science,* notably a series entitled *Researches in Acoustics;* several contributions to the *Scientific American Supplement; Lecture Notes on Physics* (1868); *The Earth a Great Magnet* (1872); *Light* (1877); and *Sound* (1878).

MAYER, Brantz: American author: b. Baltimore 1809, Sept. 27; d. there 1879, Mar. 21. He was educated at St. Mary's College, Baltimore, studied law by himself during an oriental voyage in 1827-8 and then at the University of Maryland; was admitted to the bar in 1829; and after a year in Mexico as secretary of legation wrote *Mexico as It Was, and as It Is* (1844). In the same year he founded the Maryland Historical Society. In the Civil war he sympathized with the Union, was president of the Union State General Committee, and from 1863 to 1871 paymaster in the United States army. His best book was *Captain Canot,* a story of the slave trade founded on fact. He also wrote *Mexico, Aztec, Spanish, and Republican* (1851); *Mexican Antiquities* (1858); *Memoir of Jared Sparks* (1867), and *Baltimore as It Was, and as It Is* (1871).

MAYER, Constant: American artist: b. Besançon, France, 1852, Oct. 4; d. 1901. A student at the School of Fine Arts in Paris, he left his studies in 1857 and settled in New York, where his sketches and portraits won immediate success. His portraits of Grant and Sherman and his life-sized genre paintings, such as *Maud Müller, The Song of the Shirt, Evangeline,* gained much popularity. From 1866 he was an associate of the National Academy of Design.

MAYER, Frank Blackwell: American artist, brother of Alfred Marshall Mayer (q.v.) and nephew of Brantz Mayer (q.v.): b. Baltimore 1827, Dec. 27. He studied art there under A. J. Müller, and under Gleyre and Brion in Paris and then settled in Annapolis. He made a special study of Dakota Indian types; contributed to *Harper's* and *Century* various articles with his own illustrations; and exhibited in the Paris Salon and at the Centennial Exhibition of 1876, where he received a medal for two pictures, *The Continentals* and *Attic Philosopher.* Among his other canvases are *Feast of Mondawmin; The King's Fool; The Trappist; Maryland in 1750; Crowning a Troubadour,* and *The Treaty of Traverse des Sioux.*

MAYER, Henry: American caricaturist: b. Worms, Germany, 1868, July 18. Educated in Germany and England, he at first followed a business career in the latter country, but emigrating to the United States in 1887, soon won for himself a distinct place as caricaturist, by his designs and illustrations for American and European papers. Since 1893 he has resided in New York. His works are: *Autobiography of a Monkey* (1896); *In Laughland* (1899); *Fantasies on Ha-Ha* (1899); *A Trip to Toyland* (1900); *Adventures of a*

Japanese Doll (1901); *Alphabet of Little People* (1901); etc.

MAYER, *mī-ėr*, JOHANN TOBIAS: German mathematician and astronomer: 1723, Feb. 17—1762, Feb. 20; b. Marbach, Würtemberg. He was self-educated chiefly, at Esslingen; at the age of 22 published original studies in geometry; engaged in improved map-making in Nuremberg, 1746-50; published, 1750, a greatly improved account of the librations of the moon, which Lalande's *Astronomy*, 20th book, copied almost entire; elected professor of economy and mathematics, University of Göttingen, 1751; and (1754) became superintendent of the observatory. He produced a very valuable catalogue of 998 zodiacal stars, each observed from 4 to 26 times, and of others less often noted. His fame rests chiefly on his lunar tables, published 1753 with new solar tables, and sent to England 1755, to compete for the prize offered by parliament for a method of finding longitude at sea. After his death a grant of £3,000 was made to his widow. He is credited with the first definite attempt to establish a mathematical theory of magnetic action, and with other important discoveries.

MAYER, JULIUS ROBERT VON: German physicist: b. Heilbronn, Würtemberg, 1814, Nov. 25; d. there 1878, Mar. 20. He was educated at the gymnasium in Heilbronn, studied medicine at Tübingen, and finished his university studies at Munich and Paris. In 1840 he went to Java as a ship's surgeon, and while there turned his attention to studies of the blood, extending his work to exhaustive investigations of animal heat, to which he applied the mechanical theory. Returning in 1841 to Heilbronn, where for some years he practiced his profession, he became deeply engrossed with his scientific labors, and in 1842 published in Liebig's *Annalen der Chemie und Pharmacie* a preliminary statement of his revolutionary theory of heat, together with his views on the conservation and correlation of energy. Three years later he restated his results, at the same time giving a forecast of his theory of the meteoric origin of the sun's heat. Contemporaneously with Mayer the mechanical theory of heat was worked out independently by J. P. Joule in England, and a controversy arose regarding the priority of discovery. The Royal Society gave Mayer the Copley medal in 1871, and two years before his death he was ennobled by the king of Würtemberg. His collected works appeared in 1867 under the title of *Die Mechanik der Wärme*. Consult: Weyrauch, *Robert Mayer* (1890), and Gross, *Robert Mayer and Hermann von Helmholtz* (1898).

MAY'FIELD: city, county-seat of Graves co., Ky.; on the Illinois Central railroad; about 30 m. from the Mississippi river and 25 m. from the Ohio at the mouth of the Tennessee. It was settled about 1820 and incorporated in 1850. It is in a fertile agricultural region

in which the chief product is tobacco. Mayfield has large tobacco warehouses and factories, clothing factories, woolen mills, fire-clay works, flour and lumber mills. It has an extensive trade in tobacco. The mayor is elected once in four years; the council acts upon the appointments of the executive. Pop. (1910) 5,916.

MAY'FLOWER, THE: the name of the vessel in which the Pilgrim Fathers, or first colonists in New England, sailed to this country in 1620. The *Mayflower* was a vessel of 180 tons. She set sail from Southampton, England, on Aug. 5, 1620, in company with her sister ship, the *Speedwell*, but the courage of the captain and the crew of the latter vessel failing, both ships put back to port. Finally, on Sept. 6, the *Mayflower* again spread her sails from Plymouth, having on board as passengers 41 men and their families, 102 persons in all. They succeeded in crossing the Atlantic, after a stormy voyage of 63 days. They intended to go to the mouth of the Hudson river, but the captain of the *Mayflower* took them to Cape Cod. They landed at Plymouth, Mass., at a point where Plymouth Rock, a huge granite boulder, stands at the water's edge. A complete and authentic list of the male passengers who landed from the *Mayflower* is as follows:

THE MAYFLOWER PASSENGERS.

Allerton, Isaac	Hopkins, Stephen
Allerton, John	Howland, John
Billington, John	Leister, Edward
Bradford, Wm.	Margeson, Edward
Brewster, Wm.	Martin, Christopher
Britterage, Richard	Mullins, William
Brown, Peter	Priest, Degony
Carver, John	Rigdale, John
Chilton, James	Rogers, Thomas
Clarke, Richard	Soule, George
Cook, Francis	Standish, Miles
Crackston, John	Tilly, Edward
Dotey, Edward	Tilly, John
Eaton, Francis	Tinker, Thomas
English, Thos.	Turner, John
Fletcher, Moses	Warren, Richard
Fuller, Edward	White, William
Fuller, Samuel	Williams, Thomas
Gardiner, Richard	Winslow, Edward
Goodman, John	Winslow, Gilbert

With these 41 male passengers and heads of families came 15 male servants, whose names were as follows:

SERVANTS ON THE MAYFLOWER.

Carter,	Langemore,	Sampson,
Coper,	Latham,	Story,
Ely,	Minter,	Thompson,
Holbeck,	Moore,	Trevore,
Hooke,	Prower,	Wilder.

The following is a copy of the covenant agreed upon by these first settlers of Massachusetts, signed and subscribed on board the *Mayflower* at Cape Cod 1620, Nov. 11, two days after the ship came to anchor:

THE MAYFLOWER COMPACT.

In the name of God Amen! We whose names are underwritten, the loyal subjects of our dread sovereign Lord,

King James, by the grace of God, of Great Britain, France and Ireland, King, Defender of the Faith, etc., have undertaken for the glory of God and the advancement of the Christian faith, and honor of our King and Country, a voyage to plant the first colony in the northern parts of Virginia; do by these presents, solemnly and mutually, in the presence of God and of one another covenant and combine ourselves together into a civil body politic for our better ordering and preservation, and furthermore of the ends aforesaid; and by virtue hereof to enact, constitute and frame just and equal laws, ordinances, acts, constitutions, and offices from time to time, as shall be thought most mete and convenient for the general good of the colony; unto which we promise all due submission and obedience. In witness whereof we have hereunto subscribed our names, at Cape Cod, the 11th of November, in the year of the reign of our sovereign Lord, King James of England, France and Ireland, the Eighteenth, and of Scotland the Fifty-fourth, Anno Domini 1620.

Whittier, Lowell, Holmes, and other poets have immortalized the *Mayflower* in well known poems.

MAYFLOWER DESCENDANTS, Society of: an American patriotic society founded in New York City 1894, Dec. 22. Its membership is confined to lineal descendants of any passengers on the *Mayflower*, the voyage of which terminated at Plymouth Rock, Mass., in 1620, Nov. There are also numerous state societies of a similar character. There are over 2,000 members of the society.

MAY-FLY, Shad-fly, or Day-fly: members of the order *Ephemeridæ*. The species, of which about 300 have been described, nearly one-third of which are North American, are fragile insects with large fore-wings, small or wanting hind-wings, short antennæ, atrophied mouth parts, and two or three thread-like abdominal filaments. Being greatly attracted to lights, the adults are often a source of annoyance in lake-side and river-side towns, and are sometimes especially troublesome in obscuring the lights from light-houses. The eggs are laid in fresh water either upon the surface or upon the bottom, the female diving for this purpose. The larvæ, which feed mainly upon vegetable matter, are active creatures with strong legs, abdominal tracheal gills and anal appendages. They live upon the bottom, under stones, covered with mud, or in burrows. After moulting about 10 times wing pads appear, and these increase with each moult until the last, which may be number 20. This occurs in the open air, the one previous to which occurs at the surface of the water, the insect escaping from its sub-imago skin rather suddenly. One striking difference the adults exhibit is the development of paired sexual organs, which do not appear in other orders of insects. The larvæ may take three years to develop; the adults live only a few days, lay their eggs and die. Both adults and larvæ are important food for fishes, and consequently they form a favorite bait with anglers, and are imitated in making artificial flies.

MAY'HEM (Maim). See Beating and Wounding; Assault.

MAYHEW, *mā'hū*, Experience: missionary to the Massachusetts Indians: 1673, Jan. 27—1758, Nov. 29; b. Martha's Vineyard; son of John Mayhew, and great-grandson of Gov. Thomas Mayhew. He succeeded to the charge of five or six Indian congregations, 1694, Mar., and carried on a remarkable work of instruction and conversion of the natives, with whose language he had been familiar from childhood. He translated the gospel of John for his converts, and made a new version in their tongue of the Psalms (1709). In his *Indian Converts* (1727), he gave an account of 30 Indian preachers, and 80 other native men, women, and children. He published *Grace Defended*, 1744, in opposition to new views then advanced. He was made M.A. by Harvard College 1720.—His son, Zachariah Mayhew (1717—1806) carried on the Indian mission work from 1767 to his death.

MAY'HEW, Jonathan, D.D.: 1720, Oct. 8—1766, July 9; b. Martha's Vineyard, Mass.; son of Experience Mayhew: a patriot and rationalist minister of Boston, Mass., in the pulpit of the West Church, from 1747, June, to his death. He graduated from Harvard College 1744, and was notable for learning and literary ability. He adopted new opinions which would now be classed as evangelical Unitarian, and which led to his exclusion from the Boston ministerial association, though in a later generation these opinions became prevalent in that body. Dr. Mayhew was a most ardent and powerful political preacher and writer, and died at the age of 46, overtaxed by zealous labors on behalf of the liberties of the colonies. He did much to prepare the way for the Revolution. His last word from his death-bed was a letter to James Otis (q.v.) strongly urging the union of the colonies. His church, among whose pastors have been Dr. Chas. Lowell and Dr. Cyrus A. Bartol, has become extinct.

MAY'HEW, Thomas: 1592, Mar.—1682, Mar.; b. England: Puritan merchant of Southampton, Eng.; emigrant to New England 1631, an early resident of Watertown, Mass. In 1641 he received from Lord Stirling a grant of land, and the office of governor of Martha's Vineyard (q.v.), and from 1642, with the aid of his son, Thomas Mayhew, as minister, prosecuted for 40 years a most remarkable work of Indian instruction and elevation, even preaching himself at the age of nearly 70, after the death of his son.—His son, Thomas Mayhew (1621—1657), b. Southampton, England, gathered a church of Indian converts which in 1662 numbered 282. He joined John Eliot in preparing *Tears of Repentance, or a Narrative of the Progress of the Gospel among the Indians in New England* (London, 1654).

MAY LAWS: regulations suggested by Count Ignatieff and sanctioned by the Czar, 1882, May 3 (15), and

fraught with such disastrous consequences to the Jews of Russia that they have become historic. They applied to the Pale of Settlement (q.v.), forbade Jewish settlement elsewhere, except for agricultural colonies; the issuing of mortgages, etc., to the Jews, their holding of real property outside of towns and boroughs, and issuing to them powers of attorney; while Jews were to transact no business on Sundays and the chief Christian holidays. Passed merely as temporary measures, they continue in force. Ostensibly to protect the Jew from popular outburst and to lessen the economic dependence of the native population upon the Jews, they are in reality in line with the Panslavist policy of repression; and have lowered the status of the Jew to an intolerable condition. The complete revision of laws affecting the Jews is not to be expected from the present outlook.

MAYNARD, *mā'nard*, CHARLES JOHNSON: American naturalist: b. West Newton, Mass., 1845, May 6. He had a common school education, worked on a farm, and devoted himself to natural history as a boy. He is well known as an ornithologist, discovered the bittern's vocal organs, and in 1875 was elected vice-president of the Nuttall Ornithological Club, in connection with which he founded and edited *The Nuttall Bulletin*. As a conchologist he studied the genus *Cerion* of West Indian shells. He also made important additions to the knowledge of American butterflies. Maynard wrote: *Naturalists' Guide; Butterflies of New England; Eggs of North American Birds; Contributions to Science; Manual of North American Butterflies; Sparrows and Finches of New England; Sponges; Warblers of New England; The Genus Strophia; Manual of Taxidermy; Birds of Eastern Massachusetts; Field Directory of the Birds of Eastern North America; Down in New England;* etc.

MAYNARD, EDWARD: American inventor: b. Madison, N. J., 1813, Apr. 26; d. Washington, D. C., 1891, May 4. He entered West Point in 1831; resigned because of ill-health in 1832; studied dentistry; and practiced in Washington from 1836 to 1890. He invented new dental tools; discovered in 1846 the diversity of the maxillary antra; introduced the method of filling cavities with gold foil; taught dentistry in the Baltimore College of Dental Surgery and in the National University at Washington; and practiced successfully in Europe. His great fame was due to his invention of small arms and new priming methods which superseded percussion caps. He patented a breech-loading rifle in 1851; a method of converting muzzle-loaders to breech-loaders in 1860; a plan to join two barrels so that contraction and expansion in either would be independent of the other, in 1868; and in 1886 a registering device showing the number of cartridges in a magazine rifle. His rifle was adopted by the United States, and brought him decorations from the governments of Belgium, Prussia, and Sweden.

MAYNARD, George Willoughby: American artist, son of Edward Maynard (q.v.): b. Washington, D. C., 1843, March 5. He studied art in the Royal Academy of Antwerp; worked in Paris in 1878; then returned to America, where he received a medal from the Pennsylvania Academy of Fine Arts in 1884, and was elected to the National Academy in 1885. He was president of the Salmagundi Sketch Club and of the American Black-and-White Society. Besides his portraits, Maynard's most important canvases are: *Vespers at Antwerp* (1776); *Water Carriers of Venice; A Musician; Bachelor's Breakfast; Ancient Mariner; Old and Rare; Strange Gods;* and *Grandfatherly Advice.*

MAYNARD, Horace: American politician: b. Westboro, Mass., 1815, Aug. 30; d. Knoxville, Tenn., 1882, May 3. He was graduated from Amherst College in 1838; and became instructor, and later professor, in East Tennessee College, Knoxville, Tenn. He studied law, was admitted to the bar in 1844, and built up a successful practice. In 1857 he was nominated for member of congress by the know-nothing party, and elected. On the outbreak of the civil war he declared his loyalty to the Union and took an active part in the unsuccessful attempt to keep Tennessee from seceding; on this account he suffered persecution and heavy loss of property during the war. In 1866-75 he was again member of congress, being representative-at-large for his state in the last two years. In 1875 he was appointed minister to Turkey, and in 1880 postmaster-general in President Hayes' cabinet, holding the office till 1881, March 4.

MAYNOOTH, *mā'nôth:* village of county Kildare, Ireland, 15 m. n.w. from Dublin by the Midland Great Western railway; pop. including the college (1881) 1,174. It is of some historical interest as the seat of the powerful family of the Geraldines, of whose castle, demolished during the Cromwellian wars, large and impressive ruins remain; and as the scene of more than one struggle with the English power. The Royal Catholic College of Maynooth, instituted by the Irish parliament 1795, a Roman Catholic seminary, for the priesthood, was the occasion of controversy in Great Britain for many years. It met a necessity created by the utter destruction, through the French revolution, of the places of education in France on which the Irish Rom. Cath. clergy, excluded by the penal laws from the opportunity of domestic education, had previously relied. The original endowment, an annual vote of £8,928, was continued by the imperial parliament after the act of union, though not without sustained opposition. In 1846 Sir Robert Peel carried a bill for a permanent endowment of £26,000 a year, to which was added a grant of £30,000 for building purposes. The building erected under the original endowment is a plain quadrangle. The new college is a very striking Gothic quadrangle by Pugin, containing professors' and

students' apartments, lecture-halls, and a singularly fine library and refectory. Pugin's design included a chapel and common-hall, which, in lack of funds, have been postponed. Under the act of 1845, the college was to receive 500 students, all destined for the priesthood. The full collegiate course was of eight years, two in classics, two in philosophy, and the remaining four in directly professional studies of divinity, scripture, church history, canon law, and the Hebrew and Irish languages. The divinity students, 250 in number, received a money stipend of £20 annually; and at the close of the ordinary course, 20 scholarships, called from the founder, 'Dunboyne Scholarships,' were assigned by competition to the most distinguished students, and might be held for three years. The legislative authority was vested in a board of 17 trustees, and the internal administration in an academical body, consisting of a president and vice-president, with a numerous body of professors and deans. A visitorial power was vested in a board of 8 visitors, of whom 5 were named by the crown, and 3 elected by the trustees. In 1869, by the Irish Church Act at the disestablishment, the Maynooth endowment was withdrawn —a capital sum, 14 times its amount, being granted to the trustees for discharge of existing interests. The college, however, is still maintained on the same footing. The educational arrangements are unaltered and though the number of pupils, owing to the suspension of free studentships and exhibitions, has somewhat fallen off, the diminution is regarded as temporary. The former visitorial powers under the act of parliament are now exercised by visitors appointed by the trustees, and all state connection is at an end. The college also possesses, through donation and bequest, some landed and funded property, the most considerable of which is that of Lord Dunboyne, Rom. Cath. Bishop of Cork, who had for a time conformed to the Protestant faith. 1878, Nov., a great part of the college buildings was burned.

MAYO, *mā'ō*, AMORY DWIGHT: American Unitarian clergyman and educator: b. Warwick, Franklin county, Mass., 1823, Jan. 31; d. 1907, April 8. He was graduated from Amherst, and taught in the public schools in Massachusetts 1839-44. In 1846 he became the minister of the Universalist Church at Gloucester, Mass., and later held Universalist pastorates at Cleveland, Ohio (1854-6), and at Albany, N. Y. (1856-63). He then entered the Unitarian ministry, and was pastor at Cincinnati, Ohio (1863-72), and at Springfield, Mass. (1872-80). He was long prominent as an educator, was an efficient and active member of the boards of education in Cincinnati and Springfield, and was connected with the Meadville (Pa.) Theological School as lecturer and professor from 1868-98. From 1880 he devoted his attention chiefly to the advancement of education in the south, lecturing frequently in many different states. He was the chief edi-

torial writer for the *New England and National Journal of Education*, and published *The Moral Argument for Universalism; Graces and Powers of the Christian Life* (1852); *Biography and Collected Writings of Mrs. S. C. E. Mayo; Symbols of the Capitol, of Civilization in New York* (1859); *Talks with Teachers* (1885); *Southern Women in the Recent Educational Movement in the South* (1892); and *History of the American Common School.*

MAYO, Frank: American actor: b. Boston 1839, April 19; d. 1896, June 8. His first appearance on the stage was at the American Theatre in San Francisco, and he was for several years the leading actor on the Pacific coast. In August, 1865, he appeared in Boston as Badger in *The Streets of New York* with great success, and though he played Shakespearian and other roles acceptably, became best known in his character of Davy Crockett, first played by him in Rochester, N. Y., in 1872, and thereafter almost exclusively by him till 1884. In later years he played in his own drama of *Nordeck*, and in a stage version of *Pudd'nhead Wilson.*

MAYO, Isabella Fyvie, 'Edward Garrett': English novelist: b. London 1843, Dec. 10. She is of Scottish parentage, and was married to J. R. Mayo, a solicitor, in 1870. Since his death, in 1877, she has resided in Aberdeen. Among her works are: *Occupations of a Retired Life* (1868); *Friends and Acquaintances* (2d ed. 1872); *By Still Waters* (new ed. 1886); *The Capel Girls* (new ed. 1877); *The House by the Works* (new ed. 1881); *Equal to the Occasion* (1887); *A Daughter of the Klephts* (1897); *Chrystal Joyce* (1899). Her stories, many of which are semi-religious in cast, have been much read in this country.

MAYO, *mī'ō:* a tribe of Mexican Indians of the Pinan family, located on the banks of the Mayo river in southern Sonora. Their allies and northern neighbors are the Yaquis (q.v.), and their habits and language are almost identical. They are a peaceful, agricultural people and are thoroughly Mexicanized. They number perhaps 6,000.

MAYO-SMITH, *mā'ō-smĭth',* Richmond: American political economist: b. Troy, Ohio, 1854, Feb. 9; d. New York city 1901, Nov. 11. He was graduated from Amherst College in 1875, and studied in Germany for two years. From 1877 he was connected with Columbia University, first as assistant in history and political science, then as adjunct professor (1878-83), and professor of political economy and social science (1883-1901). He was also one of the faculty of the graduate School of Political Science, established in 1880, and his chief work as teacher was done in this school. His specialty was statistics, on which he was a recognized authority. He was an honorary fellow of the Royal Statistical Society of Great Britain, a member of the International Statis-

tical Institution of the American Statistical Association, being vice-president of the latter; he was also a member of the National Academy of Science, and of the American Economic Association, of which he was one of the founders. He was editor of the *Political Science Quarterly* from 1886, and published *Emigration and Immigration* (1890); *Statistics and Sociology* (1895); and *Statistics and Economics* (1899).

MAYON, *mā-yōn':* a volcano of the Philippines situated in the northern part of the province of Albay, Luzon, height 8,274 feet. It rises from a broad plain about six miles from Albay Gulf, and forms a perfect cone; its summit is surrounded by vapor, which at night has a fiery glow. Its sides, almost to the top, are covered with grass or moss, and the ascent, though it has been made, is difficult. Near the summit there are fissures which emit sulphurous gases and steam, and there were several eruptions during the 19th century, the town of Cagsaua at the foot of the mountain being entirely destroyed in 1814.

MAYONNAISE, *mā-ŏn-āz':* a thick cold dressing for salads, cold meat, poultry, fish, vegetables, etc., made of the yolks of eggs, salad oil, and vinegar, with a little salt and pepper; it is sometimes colored red with powdered lobster shell, or green with spinach or parsley.

MAYOR, n. *mā'ėr* [OF. *maieur;* F. *maire,* the chief magistrate of a town—from L. *majōrem,* greater; in mid. L. *maj'ŏrem,* chief man of a city: comp. Gael. *maor,* an officer of justice]: the chief magistrate of a city or corporate town. MAYORALTY, n. *mā'ėr-ăl-tĭ,* the office of a mayor; also the time during which he holds the office. MAY'ORESS, n. *-ėr-ĕs,* the wife of a mayor.

MAY'OR: originally a steward, bailiff, or overseer, thence the chief magistrate of a city or corporate town. The mayor is the head of the local judicature, and the chief executive officer of the municipality: in England he is elected by the council from the aldermen or councilors, and holds office for a year only; in the United States he is elected usually by popular vote. His powers vary according to the charters of the various cities, and are liable to annual changes by the legislature of the state. Thus in some cities the mayor's powers are great; in others they are divided with executive boards, or dependent on confirmatory action by aldermen or common council.—The first mayor of London was appointed 1189, the first mayor of Dublin 1409. The mayors of London, York, and Dublin are called 'Lord Mayor.' The Lord Mayor of London has the title 'Right Honorable,' which, with the title 'Lord,' was allowed first by Edward III. 1354: he is the representative of royalty in the civil government of the city, the chief commissioner of lieutenancy, the conservator of the river Thames; and on the demise of a sovereign he becomes, *pro tempore,* a

member of the privy council. To sustain the hospitality of the city he receives an allowance of £8,000 a year, with the use of the Mansion-house, furniture, carriages, etc. He is chosen by the Livery (q.v.) Sept. 29, being usually the senior alderman, who has been sheriff, but not Lord Mayor. In former times, it was the ambition of the first merchants and bankers of the city to become Lord Mayor; but since the district within the metropolitan boundaries has come to be but a small fraction of what is generally known as London, this has ceased to be the case; and it is only in other than English eyes that the Lord Mayor of London is one of the important public functionaries of the realm.

In the United States both legislative and administrative functions are possessed by the mayor. He very frequently, although not universally, has the veto power and sometimes presides over the council and appoints the committees. His principal powers are executive, however, and as the head of the administrative service he exercises powers that make him by far the most important person in the city government. He usually appoints and frequently may remove at will the principal officials, except the few that are elected, and consequently determines to a great extent what their policies shall be. The tendency is toward an increase of these powers; in fact, that has been the trend since the first of the 19th century. As the council has declined, the mayor has grown stronger. The method of selection, with a few exceptions, is by popular vote. Salaries range from $15,000 in New York down to small amounts in the less important cities. There are very few over $5,000 per year. Terms of office vary from one to five years, the usual length being two years in the larger cities, with one year becoming more common as the size of the city decreases. In practice, a reëlection is not uncommon, but it is rarely that a man serves more than two terms.

In France, the *maire* more nearly resembles his American contemporary. He is a member of the council and its presiding officer, but has no veto. He prepares the provisional budget and has full power over the administration. He appoints most of the salaried officials, and may remove them. He controls the property of the city, directs public works, supervises expenditures, etc. As agent of the central government he has charge of the police and oversees the faithful execution of the national laws. He is elected, as in England, by the council, but is responsible to the central government rather than to the city. His term of office is four years.

The Prussian *bürgermeister* is not a member of the elective council, but of the board of magistrates—a sort of executive council which initiates legislation and perfects local ordinances. He does not directly appoint the other administrative officials, but he has considerable influence in this direction, being the head of the board

of magistrates, which directs and controls all departments. Tenure of office is very long; the appointment is ordinarily for 12 years and sometimes for life. Burgomasters have professional training for administration, a life occupation, and are well paid considering the salaries usually given in Germany. Promotions from a small to a larger city are common.

MAYOTTA, *mâ-yŏt'ta:* one of the Comoro Isles (q.v.), ceded to France 1843; lat. 12° 34′—13° 4′ s., and long. 44° 59′ 15″—45° 23′ e. It is of irregular form, 21 m. from n. to s., average breadth 6 or 7 m.; if, however, the dangerous coral reefs which surround the island be included, the whole occupies a space 30 m. n. and s. and 24 m. e. and w. The surface of Mayotta is very uneven, and is studded with volcanic-looking peaks, some of which exceed 2,000 ft. in height. The shores of the island are in some places lined with mangrove swamps, uncovered at low water, and productive of malaria and fever. The island is in most parts capable of cultivation, and contains several sugar plantations, producing annually 40,000 to 50,000 cwts. of sugar; total exports for a year valued at nearly $250,000. It is principally sugar that is exported; and the supply of food grown on the island is insufficient for the inhabitants. The total imports in a year do not exceed in value $125,000. As a colony Mayotta has not fulfilled the expectations entertained by the French at the time of its occupation, notwithstanding the unusually liberal terms held out to colonists. The French establishment is on the island of Zaondzi, inside the chain of reefs on the e. side of Mayotta, and consists of a governor, colonial officer, some artificers and seamen, and about 100 soldiers, besides a few native ones. There are several substantial government buildings and storehouses; there is a good roadstead, and the fort has been recently fortified. Mayotta is the only refuge for French ships in the Indian ocean. It is the principal market for the neighboring islands. Pop. about 12,000.

MAYSVILLE, *māz'vĭl:* Ky., city, county-seat of Mason county; on the Ohio river, and on the Louisville & N. and the Chesapeake & O. railroads; about 63 miles southeast of Cincinnati. The first settlement was made about 1782, and in 1787 it was incorporated by the legislature of Virginia. In 1833 it was granted a city charter. It is in a rich agricultural region, and its facilities for transportation give it considerable commercial importance. Its chief manufacturing establishments are flour and lumber mills, foundries, distilleries, cotton mills, plow and pulley works, boot and shoe factories, tobacco, and furniture. Some of the prominent buildings are the Masonic Temple, the Odd Fellows' Temple, and the Maysville and Mason County Public Library. The library organization was established in 1878. The government of

the city is vested in a mayor, who holds office four years, and a council. Pop. (1900) 6,423; (1910) 6,141.

MAY'-WEED (*Maruta Colula*): common plant in pastures and meadows and on roadsides, in Europe and America. The flower is like that of chamomile (genus *Anthemis*), and the plant is called sometimes Stinking Chamomile: the two genera are occasionally confounded. May-weed is of ord. *Compositæ*.

MAZARD, *măz'ĕrd:* a variety of black cherry.

MAZARD. See under MAZER.

MAZARIN, *măz-a-rēn'*, F. *mâ-zâ-răng'*, JULES (Ital. *Giulio Mazarini*): cardinal and chief minister of France during the minority of Louis XIV.: 1602, July 14—1661, Mar. 9; b. Rome, or, some say, at Piscina in the Abruzzi. The social position and occupation of his father are points in dispute. Mazarin was educated by the Jesuits at Rome till his 17th year, and then studied law at Rome and at the Spanish universities, where he contrived to unite industry with amorous gayety. Afterward, he entered the pope's military service, perhaps about 1624. Having accompanied a papal legate to the court of France, he became known to Richelieu about 1628, who perceived his great political talents, and engaged him to maintain the French interests in Italy, which he did while still employed by the pope as vice-legate to Avignon (1632), and nuncio to the French court, an office to which he was appointed 1634. The Spaniards complained of his partiality for France, and the pope was obliged to recall him. The subtle Italian was not thus to be checkmated. In 1639, he openly entered the service of Louis XIII., and was naturalized a Frenchman; and in 1641—though not a priest, and having received only minor orders—received a cardinal's hat, on the presentation of the king of France, through the influence of Richelieu, who, when dying, recommended Mazarin to the king as the only person capable of carrying on his political system. At the death of Richelieu, 1642, Mazarin was made supreme minister. The king died 1643, and Mazarin's position was one of great difficulty amid the intrigues, jealousies, and strifes of the earlier years of Louis XIV.'s minority. The queen-mother, Anne of Austria, had been deemed hostile to him; but though she was declared sole regent and guardian of the young king, Mazarin kept his place as minister, and soon made himself indispensable to her, partly by his wonderful business qualities, and still more by the exquisite charm of his manner, so that, although with greater smoothness, he ruled with almost as unlimited a sway as Richelieu. Already indeed, in anticipation, he had contrived to touch the queen's heart with his Spanish gallantry. The parliament, thinking to regain political power, resisted the registration of edicts of taxation; but Mazarin caused the leaders of the opposition to be arrested, upon which the dis-

turbances of the Fronde (q.v.) began. The court retired to St. Germain; Mazarin was outlawed by the parliament; but by the truce of Ruel he still remained minister. The feeling against him, however, became still more inflamed, when, at his instigation, the queen-regent caused the Princes of Condé and Conti and the Duke of Longueville to be arrested 1650, Jan. Mazarin went in person at the head of the court troops to the insurgent provinces; and after the victory at Réthel, showed so much insolence, that the nobles and the people of the capital made common cause against him, and he thought it necessary to secure his safety by flight to the Netherlands, while the press teemed with violent publications against him, known as *Mazarinades*. After the rebellion of the Prince of Condé, he ventured to return to France; but Paris making his removal a condition of its submission, he retired again from the court 1652, Aug., and it was not till 1653, Feb. 3, that he made a triumphant entry into the capital, where he was received with significant silence. Yet in a short time he was again popular, and had acquired his former power. Mazarin's foreign policy was strong and successful; under it the influence of France among the nations was increased; but in the internal government of the country those principles of despotism were established on which Louis XIV. afterward acted. The administration of justice, however, became very corrupt, and the commerce and finances of the country sank into deep depression. It is admitted that as a financial administrator he was far inferior to Richelieu. Mazarin died at Vincennes. Mazarin was a man whose adroitness and address rose to the height of genius. He was very niggardly and very avaricious, and had acquired in various ways, fair and foul, an immense fortune, amounting to 12,000,000 livres, which he offered to the king shortly before he died; afraid, it is thought, that it might be rudely seized from his heirs. Louis declined the restitution, which was perhaps what the wily minister expected. The assertion that he was privately married to the queen, Anne, is open to some question, though probably true. See the *Memoirs* of Mazarin's contemporaries, Retz, Madame Motteville, La Rochefoucauld, Turenne, Grammont, etc.; *Siècle de Louis XIV.*, by Voltaire; *Mme. de Longueville*, etc., by Victor Cousin; and A. Renée's *Les Nièces de Mazarin*.

MAZARINE, n. *măz'ă-rēn'* [said to be after Cardinal *Mazarin*]: a deep-blue color; a method of dressing fowls; a little dish set in a large one. MAZARINE BIBLE, edition of the Latin Vulgate discovered in the library of Cardinal Mazarin. From this John Gutenberg printed the first book in the production of which cut metal types were used, 1450-55. MAZ'ARINE' GOWN, n. the gown of mazarine blue worn by a common councilman in some European cities.

MAZATLAN, *mâ-sât-lân':* seaport of Mexico, at the mouth of the river Mazatlan, which falls into the entrance to the Gulf of California, lat. 23° 10′ n., long. 106° 21′ w. It is a well-built and picturesque town. The climate is healthful, but very hot (85° to 105° in the shade during Aug.). The people are a mixed race of old Aztec Mexicans, Indians, Spaniards, and negroes. The chief exports to California and Europe are silver dollars, Brazil or Lima wood, and copper; imports are provisions, machinery, British hardware and crockery, and dry goods from France and Germany. In 1864, the town was besieged by the French and imperial troops. The harbor of Mazatlan, though much exposed to winds from the s.w., is the most important on the w. Mexican coast; and the port is often visited by American and English vessels. Pop. 17,500.

MAZDEISM, n. *măz'dĕ-ĭzm* [from *Ahuró-Mazdâo,* Harmusd, the good god of the Persian system—from Zend, *ahur,* lord; *mazda,* wise, a sage]: a name for Zoroastrianism: see ZOROASTER: PARSEES. MAZ'DEAN, a. *-an,* pertaining or relating to Mazdeism.

MAZE, n. *māz* [from incoherent senseless chatter being the most obvious symptom of a confused or unsettled mind—Swiss, *mausen,* to speak unintelligibly; Icel. *masa,* to jabber, to chatter: Norw. *masast,* to begin to dream]: a network of paths contrived to perplex those who enter it, and hinder their finding the way out; a perplexed state of things; confusion of thought; a labyrinth; intricacy; in *OE.,* a labyrinth trodden or cut on turf by schoolboys: V. to bewilder; to perplex; to amaze. MA'ZING, imp. MAZED, pp. *māzd:* ADJ. confused in thought; silly. MAZY, a. *mā'zĭ,* perplexed; intricate. MA'ZILY, ad. *-lĭ.* MA'ZINESS, n. *-zĭ-nĕs,* intricacy; perplexity.

MAZE, n. *māz,* or MESE, n. *mēz* [Icel. *meis,* a bag for carrying fish]: in *Scot.,* 500 herrings.

MAZEPPA, *mâ-zĕp'pâ,* IVAN ('JOHN') STEPHANOVICH: hetman of the Cossacks: 1644-1709; b. Mazepintzui, in Podolia; descended of a poor but noble family. He became a page in the service of John Casimir, King of Poland. A Polish nobleman having surprised him in an intrigue with his wife, caused him to be stripped naked, and bound upon his own horse, lying upon his back, and with his head to its tail, and sent the animal off, leaving Mazeppa to his fate. The horse carried him to his own distant residence—not to the Ukraine, as has been often said; the peasants released him half-dead, and revived him; but Mazeppa, out of shame, fled to the Ukraine, joined the Cossacks, and by his strength, courage, and activity rose to high distinction among them, and 1687 was elected their hetman. He won the confidence of Peter the Great, who loaded him with honors, and made him Prince of the Ukraine; but on the curtailment of the

freedom of the Cossacks by Russia, Mazeppa conceived the idea of throwing off the sovereignty of the czar, and for this purpose entered into negotiations with Charles XII. of Sweden. These and other treasons were revealed to Peter the Great, who did not credit the informants; but afterward, being convinced of Mazeppa's guilt, caused a number of his accomplices to be put to death. Mazeppa joined Charles XII., and took part in the battle of Pultowa, after which he fled, 1709, to Bender, and there died, ending his life by poison. His story has been made the subject of a poem by Byron, of a novel by Bulgarin, of two paintings by Vernet, and of a masterly historical work by Kostomaroff (1882).

MAZER, n. *mā'zėr* [OHG. *masen*, a spot, a scar: Dut. *maese*, a spot, a stain: Bav. *maser*, a knotted excrescence on a tree]: in *OE.*, a broad standing-up cup or drinking-bowl—so called because made of wood having a spotted or speckled grain. MAZARD, n. *măz'ėrd*, a burlesque word for the head or skull—from its likeness to a bowl: V. to knock on the head; to brain one. MAZ'ARDING, imp. MAZ'ARDED, pp. *-ėrd-ĕd.*

MAZURKA, n. *mă-zūr'kă* [from *Mazur*, a native of *Mazovia*, in Poland, where it originated]: a Polish dance for four or eight couples, resembling the Polonaise, but with more varied and lively movements: its music is usually in $\frac{2}{4}$, but sometimes in $\frac{3}{8}$ time. The peculiarity of the rhythm, which has a pleasing effect, characterizes the music of the mazurka. It is much practiced in n. Germany, as well as in Poland.

MAZZINI, *mât-sē'nē*, GIUSEPPE: Italian republican patriot: 1805, June 22—1872, Mar. 10; b. Genoa; son of a physician of note. He received sentiments of social equality from the example and teaching of his parents; and very early the degraded political condition of his country began to prey upon his mind, producing ardent aspirations for her national unity and deliverance from foreign domination, which seemed to him attainable only through a return to the republican glories of ancient times. Mazzini's patriotic enthusiasm speedily gained absolute sway over his spirit, and led him to renounce his cherished idea of a life of literature and contemplative study, for the action and strife of the political arena. In 1827, his maiden essay in literature, 'Dell' Amor Patrio di Dante,' appeared in the liberal journal, the *Subalpino;* and he subsequently contributed critical, literary, and political papers to the *Antologia* of Florence and the *Indicatore Genovese.* In the pages of the latter originally appeared the essay republished under the title *Scritti d'un Italiano Vivente.* Literature, according to Mazzini's own assertion, having been employed by the liberal party solely as a means for the great end of liberal propagandism, the journals were suppressed, and the writers disbanded. In 1830, the affili-

ation of Mazzini to the secret society of the Carbonari was the introductory step to his practical political career; and the young member was speedily invested with a preponderating influence in the counsels and missions of the body. Insnared and betrayed by a Piedmontese spy, Mazzini was arrested, detained six months in the fortress of Savona, and finally liberated on condition of his departure from Italy. After short residences in several places, he took up his abode in Marseilles, when he addressed to Charles Albert his famous letter, which drew down on the daring young writer a decree of perpetual banishment. The organization of a new liberal league, 'Young Italy,' was Mazzini's next work. Republican and unionist to the core, the tendencies of this great body were more humanitarian and universal than those of its extinct predecessor, whose theories and methods were known as Carbonarism. Mazzini was the animating spirit of this formidable league, which speedily inclosed all Europe in a network of similar associations, modified to meet the individual requirements of the various European nationalities. Banishment from Marseilles, in consequence of the extensive operations of the society having been revealed to the authorities, compelled Mazzini to resort to concealment for several months. About this time a charge was brought against him of advocating assassination as a legitimate weapon in the warfare of liberalism; but the charge was proved in the public tribunals of France to be false; and in the British parliament (1845) Sir James Graham made an apology to Mazzini for having re-echoed the calumny. The first fruits of La Giovine Italia was the revolutionary expedition of Savoy, organized by Mazzini at Geneva, but defeated by the royal troops. Sentence of death, *par contumace,* was recorded against Mazzini in the Sardinian courts for his participation in the affair; but he soon recommenced with increased vigor his revolutionary operations. A new association, 'New Europe,' based on principles of European rights and enfranchisement, was inaugurated by the exertions of Mazzini in Switzerland. In 1837, Mazzini quitted Switzerland for England, and finally took up his abode in London. Thence his labors in the Italian revolutionary cause were incessant. To trace his part in the great crisis of 1848 would be to record the history of that period, so intimately were his individual acts connected with the course of events. The resolute combatant of partial union and monarchical leadership at Milan, Mazzini retired to Switzerland on the capitulation of Milan to the Austrians, to reappear in Florence on the rising of Tuscany, and finally at Rome, where he was elected triumvir amid the triumphant rejoicings of the capital of Italy. On the surrender of Rome by Mazzini's advice, he quitted the city, and proceeded to Lausanne *viâ* Marseilles. The conduct of France he bitterly attacked in public letters to De Tocqueville

and others. He subsequently returned to London, and at his instigation risings in Milan (1853) and in Piedmont (1857) were attempted. In 1859, while lending the whole weight of his influence to the revolutionary movements going on in Italy, he combated with vigilant foresight the threatened French predominance, and refused to accord faith to the liberal program of Louis Napoleon. The Sicilian expedition of 1860 owed as much to the organization of Mazzini as to the heroic command of Garibaldi (q.v.). In 1864, he was expelled from Switzerland, and returned to England. Next year he was elected by Messina deputy to the Italian parliament; but the election, to which he himself as a republican would have declined to accede, was canceled by the parliament. Mazzini is said to have founded 1865 the 'Universal Republican Alliance.' In 1868, he fell into a dangerous illness, from the effects of which his health never recovered, though his zeal remained as ardent as ever. After an ineffective scheme for a republican rising, Mazzini ventured to enter Italy, and was arrested at Gaeta, where he remained a prisoner till Rome was taken by the Italian army. He condemned the Parisian Commune of 1871, March. On his death at Pisa, the Italian government honored him with a public funeral.

Mazzini's writings are various and extensive, and include dissertations on art, literature, and music. A complete edition (*Scritti, Editi e Inediti*) was published 1861 and following years. Whatever may be thought of Mazzini's political views, few will refuse to admire the ardent sincerity of his patriotism, or the inflexibility with which he pursued his aim, unchecked by persecution, calumny, and defeat. Mazzini possessed in the highest degree that personal fascination by which friends are converted into ardent partisans. In his private life, he is allowed to have been a model of purity and frugal simplicity, as in his public career he was conspicuous for disinterestedness and self-abnegation; and to these personal virtues of Mazzini, aided by his extraordinary influence and eloquence, those who know Italy best ascribe a great share at least in inspiring that higher tone of life manifest in recent years among the Italian youth, without which the political regeneration of the country would have been impossible. He has been well called the prophet of Italian unity; and, as a prophet, he was naturally inspired rather with the lofty ideal than with the immediately practical. See *Memoir*, by E. H. V. (London 1874).

MAZZUO'LI, or MAZZO'LA. See PARMIGIANO.

ME, pron. *mē* [AS. *me;* Ger. *mich;* Icel, *mik;* Ir., Gael. and W. *mi;* L. *me,* me]: the objective case of the pron. I. METHINKS, it appears to me.

MEACOCK, n. *mē'kŏk* [Gael. *mi-coc,* unintelligent, stupid—from *mi,* not; *coc,* intelligent: probably only a

corruption of *meek-cock*]: in *OE.*, a silly, effeminate man; a hen-pecked husband; an uxorious man: ADJ. effeminate; tame; cowardly.

MEAD, n. *mēd:* a poetic form of MEADOW, which see.

MEAD, n. *mēd* [W. *medd;* Ger. *meth;* Dut. *mede,* drink made of honey and water: Gr. *mĕthē,* drunkenness; *methu,* strong drink]: fermented and flavored liquor made from honey mixed with water. Sometimes the honey which remains in the combs, after the usual processes of dropping and squeezing, is used for making mead, which is a thin and very brisk but luscious beverage. Mead has been in use from very ancient times, and was known alike to the polished nations of s. Europe and the barbarous tribes of the north. Pliny says that it has all the bad qualities but none of the good ones of wine. The Latin name is *Hydromeli.*

MEAD, *mēd,* CHARLES MARSH, D.D., LL.D.: clergyman: b. Cornwall, Vt., 1836, Jan. 28. He graduated at Andover Theol. Seminary 1862; spent 1863-66 studying in Berlin and Halle; was professor of Hebrew in Andover Theol. Seminary 1866-82, and lived in Germany 1882-92, and was professor of Christian theology in the Hartford Theological Seminary 1892-8. He received the degree PH.D. from Tübingen 1866, and D.D. from Middlebury 1881; was a member of the Old Testament revision committee; and has published *Exodus,* in the American Lange series of commentaries (1876); *The Soul Here and Hereafter: a Biblical Study* (1879); *Supernatural Revelation* (1889); *Christ and Criticism* (1893); *Irenic Theology* (1905); etc.

MEAD, EDWIN DOAK: American author and lecturer: b. Chesterfield, N. H., 1849, Sep. 29. His early life was spent on his father's farm, and in 1866 he entered a publishing house in Boston. He studied in English and German universities 1875-9, and has since engaged in lecturing and writing. In 1889, he was associate editor of the *New England Magazine* with Edward Everett Hale, and chief editor 1890-1901. He is connected with numerous historical and social clubs, and has written: *The Philosophy of Carlyle* (1881); *Martin Luther—a Study of Reformation* (1884); *A More Beautiful Public Life* (1894); *The Roman Church and the Public Schools; Organize the World; The Influence of Emerson; The Principles of the Founders;* etc.

MEAD, *mēd,* LARKIN GOLDSMITH: b. 1835, Jan. 3, Chesterfield, N. H.: sculptor. He was educated at Brattleboro, Vt.; revealed his talent first by making in snow a colossal figure of an angel; and was aided by Nicholas Longworth, Cincinnati, O., to study, 1853-55, with Henry Kirke Brown, Brooklyn. His earlier works were *Recording Angel* (1855); *Vermont,* colossal figure, to crown the dome of the state-house, Montpelier, Vt., and *Ethan Allen,* statue in the portico of the state-

house. In 1862 he fixed his residence in Florence, Italy, and has there executed works showing original genius. Among these are: *The Returned Soldier*, group (1866); *Columbus's Last Appeal to Queen Isabella; America*, for a soldiers' monument, St. Johnsbury, Vt.; *Venice, the Bride of the Sea; The Discovery of America;* statue of Ethan Allen, for the capitol statuary hall at Washington (1874); statue of Lincoln, for the monument at Springfield, Ill., set up 1874, Oct. 15; four colossal groups, designated *Cavalry, Infantry, Artillery*, and *Navy;* and colossal statue of the Mississippi as a river-god. He has also executed high relief portraits in bronze of Henry James, W. D. Howells, and John Hay.

MEAD, Lucia Ames: American author: b. Boscawen, N. H., 1856, May 5. She is a lecturer and writer on social and economic questions, an advocate of advanced movements, including woman's suffrage. She has written: *Memoirs of a Millionaire* (1890); *To Whom Much is Given* (1898); *Milton's England* (1902); *Primer of the Peace Movement; Patriotism and the New Internationalism* (1907); etc.

MEAD, William Rutherford, LL.D.: American architect: b. Brattleboro, Vt., 1846, Aug. 20. He was graduated from Amherst College in 1867, studied architecture in New York and Europe, and upon his return to the United States became a member of the prominent New York firm of McKim, Mead & White, which has had charge of many important public and private buildings.

MEADE, *mēd*, George Gordon: general in the U. S. army: 1815, Dec. 30—1872, Nov. 6; b. Cadiz, Spain, where his father, Richard W. Meade, was U. S. navy agent. He was at school in Philadelphia, and at Washington in the school of Salmon P. Chase, and at Mt. Hope near Baltimore; graduated from West Point 1835, and served as 2d lieutenant of artillery in the Seminole war, Florida, and at the Watertown arsenal, Massachusetts, until 1836, Oct. 26, when he resigned, and entered on the profession of civil engineer. He was engaged on the construction of the railroad at Pensacola, Fla., till 1837, April; then, by appointment of the war department, on the survey of the mouth of Sabine river, and later of the mouths of the Mississippi river till 1839, Feb.; in 1840 on the survey of the boundary line between the United States and Texas; and Aug. of same year on the survey of the n.e. boundary between the United States and Brit. N. America. He was married, 1840, Dec. 31, to Margaretta, daughter of John Sergeant. 1842, May 19, he became 2d lieutenant topographical engineers, continuing the n.e. boundary survey till 1843, Nov. In 1844-5 he was engaged on surveys in Delaware Bay; 1845, Sept., he went on Gen. Zachary Taylor's staff at Corpus Christi, Texas, and took part, 1846, May, in the battles of Palo Alto and Resaca de la Palma, and in occupying Mata-

moras. Later, under Gen. Wm. J. Worth, he led the assault on Monterey, gaining there his brevet as 1st lieut. He made the march to Tampico, and was on the staff of Gen. Robt. Patterson at the siege of Vera Cruz. He then returned home, and was engaged 1847–49 in mapping surveys of Fla. reefs and building light-houses in Delaware Bay. 1849–50 he served against the Seminole Indians in Fla., and 1850–51 was again on light-house work in Delaware Bay. He received promotion, 1st. lieut. of topographical engineers, 1851, Aug. 4, and 1851–56 was employed in light-house construction at Carysfort Reef, Sand Key, Cedar Key, and Coffin's Patches, in the Florida reefs. He was made capt. topographical engineers 1856, May 19, and was on the geodetic survey of the n.w. lakes 1856; and 1857–61 had charge of all the northern lake surveys.

It was as a capt. in the U. S. regular army that M. entered service in the civil war, and henceforth, to the close of the war, he had one rank as an officer of the regular army, and another as commander of volunteers. He began 1861, Aug. 31, as brig-gen. of volunteers, in command of the 2d brigade Penn. reserves of the Army of the Potomac. His promotions in the regular army were: maj. of topographical engineers 1862, June 18; brig.gen. 1863, July 3, date of the Gettysburg victory; and maj.gen. 1864, Aug. 18. As commander of volunteers he was promoted maj.gen., with commission dating 1862, Nov. 29. He served through the war in the Army of the Potomac, in all its campaigns, and in all its battles except two. During two of the less than four years of its existence, and the two years which were the period of its greatest services and successes, he was its commander, and never led it except to victory. He changed its record of reverses at Gettysburg, in a battle which served to create the opinion at home and abroad that the issue of the war would be the victory and re-establishment of the Union.

M.'s earlier services were in the battles of Mechanicsville, Gaines's Mill, and Glendale or New Market Cross-Roads. A severe wound at Glendale sent him home to Philadelphia; but he very shortly returned and was in the second battle of Bull Run. He took Gen. John F. Reynolds's command, the Penn. reserves, in the actions in Md., and won distinction at South Mountain and Antietam, especially by the boldness and skill with which he flanked the Confederates from the right at Antietam. Gen. McClellan advanced him here on the field to the command of the first corps, when Hooker was disabled by a wound. At Fredericksburg, 1862, M., at the head of his division, broke through Stonewall Jackson's troops, driving everything before him, until he was in the presence of Lee's reserves; but for want of proper support he was compelled to fall back with heavy loss. He had two horses shot under him in this severe engagement, and got his commission as maj.gen. of vols. from the date of a bat-

tle which would have anticipated Gettysburg if the work of others had been equal to his. He was then put in command of the 5th corps, and at Chancellorsville, 1863, May, was again successful on the left in the first day's fight, until he was recalled by Hooker. Two months later, on the night of June 27, he was ordered to relieve Hooker, and the next day he took command of the Army of the Potomac, then encamped about Frederick, Md., while Lee's army of 100,000 men had gone up the Cumberland valley, for the invasion of Penn.—the boldest Confederate movement of the war. M. at once got his scattered army in motion, June 29, to bring on a general engagement, meanwhile barring Lee from Baltimore and doing him all the injury possible on the march. There elapsed but a day or two before a battle was precipitated, 1863, July 1, and continued July 2 and 3, with so great success to the Union arms, and so severe defeat and loss to the Confederates, that the Fourth of July saw Lee in full retreat for the Potomac, and the news went round the world that the Union was too strong to be broken. It had been M.'s design to take position on Big Pipe Creek, about 15 m. s.e. from Gettysburg, and await Lee's attack. But Hill's vigorous movement to Seminary Ridge July 1, driving the Union forces, after his check by Buford, to the hills beyond Gettysburg, with 5,000 Union soldiers killed or wounded, and as many more missing—Reynolds also being among the dead—was a beginning none the less serious that Hill had even more killed or wounded, though fewer missing. M. at Pipe Creek, heard the firing and sent Hancock to take command. Hancock at once thought the Gettysburg position a good one; M. also saw this and promptly changed his plans. By daylight, July 2, the armies were in array on a vast elliptical field of which Gettysburg was the centre. M. took command at noon, and the battle of that day lasted from 4 P.M. to night, with no decisive advantage to either side, except the Union success in the fight for Round Top, a position of great importance. July 3, the supreme effort of Lee, in Pickett's charge with 18,000 men, was successfully met by M., hurling his forces from all sides, as well as concentrating the batteries of his whole line, so that not one in four of the makers of one of the greatest charges in the history of war, returned alive. There were 16,000 killed, wounded, and prisoners of Lee's army that day, to 3,000 of M.'s.

M. commanded the army of the Potomac the next year under Grant, who was lieut.gen.; and led his troops with consummate ability through the battles of the Wilderness and the whole of the campaign, ending with the close of the war. From 1865, July 1, to his death, M. held department commands, for most of the time that of the milit. div. of the Atlantic. Gen. M. died in Philadelphia.

MEADE, RICHARD KIDDER: revolutionary soldier: 1746, July 14—1805, Feb.; b. Nansemond co., Va. He was

sent to Harrow, Eng., for education; soon after his return entered the revolutionary army, 1775; assisted that year, June 24, to remove arms from Lord Dunmore's house to the Williamsburg magazine; was in command of a company at the battle of Great Bridge, near Norfolk, Va., 1775, Dec.—the first shock of arms in Va.; from that time became one of Washington's aides, and served through the war in that capacity, with rank of col.; was in all the great battles fought by Washington; had charge of the execution of Maj. André. He became a farmer at the close of the war, at 'Lucky Hill,' in the Shenandoah valley. He married, 1765, Elizabeth Randolph, aunt to John Randolph, of Roanoke; and 1780, for his second wife, the widow of William Randolph, of Chatsworth.

MEADE, Richard Worsam: 1778, June 23—1828, June 25; b. Chester co., Penn.; son of George M., one of the patriots of the Revolution. He was a merchant in Philadelphia; merchant and shipowner at Cadiz, Spain, from 1803, and U. S. navy agent 1805–16. During the peninsular war he rendered great services to Spain, but was unable to collect his dues; and as the result of some suits at law, he was imprisoned. The treaty between Spain and the United States (1819) bound the latter to pay the just claims of Americans on Spain, and M. at once returned home, with a certificate of Spanish debt for $491,153.62. The commission to settle such claims refused payment on the certificate without the original vouchers; and protracted efforts to secure later recognition of the claim were unsuccessful. M. introduced merino sheep and sherry wine into this country. He was father of Gen. George G. Meade (q.v.).

MEADE, William, D.D.: 1789, Nov. 11—1862, Mar. 14; b. near Millwood, Frederick co., Va.: Prot. Episc. bishop. A graduate of Princeton, N. J., 1808, M. studied theol., and was ordained deacon 1811, priest 1814; was rector of Christ Church, Alexandria, Va., 1811–2, assistant at Millwood, Va., 1812–21, and rector 1821–29; was active 1813–4 in securing the choice of Dr. Richard C. Moore as bp. of Va., after Bp. James Madison, and in founding at Alexandria a diocesan theol. sem., in promoting educational and missionary work, in aiding colonization, and in securing emancipation of slaves. He was chosen assist. bp. of Va. 1829, Aug. 19; bp. 1841, Nov. 11; was pastor of Christ Church, Norfolk, Va., 1834–36, and was most active and successful in reviving and upbuilding the interests of the Episc. Church. He earnestly opposed secession in 1861, and submitted only to necessity. Of his numerous publications, *Old Churches, Ministers, and Families of Virginia* is of most lasting value.

MEADOW, n. *mĕd'ō* [Dut. *mœyland*, meadow-land—from *maeden*, to mow: Bret. *medi*, to cut, to mow: Bav. *mad*, hay-harvest]: land affording hay; flat grass-land. Meadows, indefinite term for level lands, usually moist, but not necessarily marshy, covered with grass, which

is usually rich in consequence of the moisture, often also from advantages of soil. The grass is either used for pasture, or is mown and carried away. *Water Meadows* are meadows in which the supply of water is increased and regulated by artificial irrigation: see IRRIGATION. The herbage of all meadows consists generally of various kinds of grasses; meadow grass, rye grass, timothy, fox-tail, red-top, and bent grass or fiorin predominating. MEADOWY, a. *mĕd′ō-ĭ*, containing or resembling meadow. MEADOW-BARLEY and MEADOW-CATSTAIL, good fodder-plants. MEADOW-HAY, hay from the mixed grasses which grow naturally in meadows. MEADOW-ORE, bog iron ore. MEADOW-SAFFRON (incorrectly the autumn crocus), plant with pale purple flower; the *Colchĭcum autumnālĕ*, ord. *Melanthācĕæ* (see COLCHICUM). MEADOW-SWEET, or QUEEN OF THE MEADOWS, favorite wild plant having crowded cymes of cream-yellow, rosaceous, and odoriferous flowers; the *Spiræa ulmārĭa*, ord. *Rosācĕæ:* see SPIRÆA.

MEAD′OW GRASS: genus of grasses common in the temperate regions of the globe and highly valued for pasturage. Several of the varieties make excellent hay, and are largely cultivated for this purpose. In Great Britain both the rough-stalked and the smooth-stalked species are largely grown in pastures. The M. G. of Abyssinia is an annual sort which in its native country yields great quantities of herbage, besides seeds which are used for making bread. Beer is made by putting slices of this bread in warm water and keeping in a closed vessel and at a high temperature for several days. Among the varieties common in England and America is the *Poa annua*, which flowers early in spring, and is often a troublesome weed in cultivated fields. In the United States several varieties have received the general name M. G. The following are the most common: Meadow Fox-tail, (*Alopecurus pratensis*), perennial plant valuable for pasture, but not desirable for hay; it flowers in May, and resembles Timothy in appearance, but has a soft spike and thrives in wet soils. Meadow Fescue (*Festuca pratensis*), useful in pastures and mowings; it thrives in a variety of soils, and flowers in June and July. Tall Meadow Oat Grass (*Arrhenatherum avenaceum*), known in France as Ray Grass; excellent for permanent pastures and for soiling; also desirable, when grown with other grasses, in mowings, especially in the south. Meadow Soft Grass (*Holcus lanatus*), known often as Velvet Grass; flowers early, seldom grows above two ft. in height; thrives in nearly all soils, and is handsome, but of little value. Rough-stalked M. G. (*Poa trivialis*), useful for pasturage and hay, adapted especially to moist soils. Fowl M. G. (*Poa serotina*), often called False Red-top; one of the most valuable varieties for moist land; it flowers late, makes good hay for cattle and sheep, and is excellent for moist pastures.—For cultivation of the various kinds of M. G., see HAY.

MEAD'OW LARK, or AMERICAN STARLING: see STARLING.

MEAD'OW MOUSE: see VOLE.

MEADVILLE, *mĕd'vĭl:* city, cap. of Crawford co., Penn.; on the Crawford and Bessemer and Lake Erie railroad; 34 m. s. of Erie, and 82 m. n. by w. of Pittsburg. It is the seat of Alleghany Coll., founded 1817 as Presb.; since 1833 under control of the Meth. Epis. Chh., with preparatory and collegiate instruction for both sexes, and a considerable library. M. is the seat also of M. theol. seminary. M. is a well-built city, in a region of rich farms, having a large trade, especially with the oil regions, and extensive manufactures of machinery, farming implements and all machine-shop products, carriages, etc. There are oil-refineries, foundries and many iron vice and boiler works at M., chocolate chips factory, silk mills, shoe-button fastener works, paint works, confectionery establishments and bridge-making factories. The Pennsylvania College of music is at M., many churches and schools, a public library, city hospital, St. Joseph's Hospital, Academy of Music, opera house, three parks, a county fair ground and a race track. The city owns and operates its electric-light and water works. M. was settled in 1789. Pop. (1910) 12,780.

MEAGHER, *mâ'her*, THOMAS FRANCIS: Irish orator and patriot: 1823, Aug. 3—1867, July 1; b. Waterford, Ireland. He was educated at the Jesuit Coll. of Clongowes, Kildare, and at Stonyhurst Coll., England; a graduate of Dublin Univ. in law, became leader of the 'Young Ireland' movement for Irish independence; 1846 helped to organize the Irish confederation; headed a delegation to Paris 1848, to congratulate the French republicans on the overthrow of Louis Philippe; was arrested and sentenced to death, but the sentence was commuted to transportation for life to Tasmania, whence he escaped, and came to New York 1852, May. He was editor of the *Irish News*, 1856, and in 1861 joined the 69th N. Y. reg., of which he served as acting major in the first battle of Bull Run. After three months' service, he organized, in New York, the Irish brigade, being col. of its 1st reg., and was advanced to command the brigade, with rank of brig.-gen. of volunteers from 1862, Feb. 2. He was engaged in the battles before Richmond, at Antietam, at Fredericksburg, where he was wounded, and at Chancellorsville, after which he resigned, 1863, May. He was again commissioned early in 1864, and served in command of the Etowah district (parts of Tenn. and Ga.) until 1865, Jan. He then became sec. of the territory of Montana, and in the absence of the gov., from 1866, Sep., was acting gov. He was drowned while on an expedition on the Missouri river, to suppress Indian hostilities. M. pub. *Speeches on the Legislative Independence of Ireland* (New York 1853), and *Last Days of the 69th N. Y. Reg. in Va.* (1861).

MEAGRE, a. *mē′gėr* [F. *maigre*; Ger. *mager*, thin, lean —from L. *măcer* or *măcrum*, lean]: lean; hungry; poor; scanty; without strength, fulness, or richness; barren. MEAGRELY, ad. *mē′gėr-lĭ*. MEA′GRENESS, n. *-gėr-nĕs*, leanness; poorness; scantiness.—SYN. of 'meagre': thin; starved; gaunt; lank; emaciated.

MEAL, n. *mēl* [Dut. *mael*, flour—from *maelen*, to grind: Goth. *malan*; Ger. *mahlen*; W. *malu*; Gael. *meil*; L. *molĕrĕ*, to grind: W. *mal*, what is ground or bruised]: ground grain not sifted from the bran or coarser portion (see BREAD): V. in *OE.*, to sprinkle, as with meal; to mingle. MEAL′ING, imp. MEALED, pp. *mēld*. MEALY, a. *mēl′ĭ*, having the qualities of meal; dry and friable; like meal; besprinkled as with meal. MEAL′INESS, n. *-nĕs*, dryness and friableness. MEAL′Y-MOUTHED [perhaps connected with Gael. *milis*, sweet—from *mil*, honey]: affectedly delicate in speech; speaking of things in softer terms than the truth warrants, from interested motives; disingenuous; hypocritical.

MEAL, n. *mēl* [Scot. *mail*, an amount of money to be paid at a fixed time: Ger. *mahl*, a meal; *mal*, a time: Icel. *mal*, the time of doing anything, especially for taking food: AS. *mael*, what is marked out, separate part]: the food taken at one time; a repast; a part. PIECEMEAL, by separate pieces; by fragments.—*Meals*, or repasts, have varied in daily number at different times and in different countries. Among the Greeks and Romans of the classic ages, it was the general practice to have the principal M. toward evening, a light M. in the morning, and another in the middle of the day. The *akratisma*, *ariston*, and *deipnon* of the Greeks corresponded nearly to the breakfast, luncheon, and dinner of the present time; the first was taken immediately after rising in the morning, the second about mid-day, and the *deipnon*, the principal M., often not till after sunset. In Rome of the Augustan age, the three corresponding meals were *jentaculum*, *prandium*, and *cœna*. The two former were simple and hasty, except among persons of luxurious habits, with whom the mid-day meal was sometimes elaborate. The *cœna*, in the evening, consisted of three courses, with often great variety of viands. Reclining was the usual posture at meals for men; the women and children were seated. Two persons, occasionally three, reclined on one couch. Before a guest took his place at table, his shoes were taken off, and his feet washed by an attendant.

In mediæval and modern Europe, the prevailing practice till nearly the middle of the 18th c. was to have three meals in the day, the mid-day, and not the evening M., being the principal one. The habits of all classes were early; four was a usual hour for rising, and five for breakfast. Twelve was the dinner-hour, when it was the usage in England, till Queen Elizabeth's time, for every table, from that of the twenty-shilling freeholder, to the table in the baron's hall and abbey refectory, to be open

to all comers, with free fare, bread, beef, and beer. Supper followed in the evening, a less abundant repetition of dinner. In the last 120 years, a revolution has been going on in the hour of dinner, which has gradually become later, till it has reached the present usage of from six to eight in the evening among the more cultivated classes. Breakfast is correspondingly later—from nine to ten. The M. called tea is but a part of dinner, and supper, as a regular M., has nearly disappeared. A light M. called luncheon (improperly *lunch*) is often taken between breakfast and dinner. Dinner has therefore come nearly to correspond with the supper of former times. The usage in the United States is increasingly, though not entirely, the same as in England; but households whose principal members are engaged in manual labor mostly retain the earlier hours of our ancestors. The change to later hours in the United States has been much more recent than in England, and is less uniform. This change of hours has brought one important change to the better in social habits: the excessive drinking, so common in Britain during the Georgian era, even among people of refinement, has disappeared; the long carousals of that period have been abridged to an hour, or half an hour, spent over wine after dinner. In Britain, dinner is, more than anywhere else, made a social meal, and an occasion of meeting one's friends; and public dinners, with toasts and after-dinner speeches, have been a characteristically British mode of celebrating any public event or anniversary—now completely naturalized in the United States. In France and Italy, the gradual advance of the dinner-hour has not proceeded further than four or five o'clock. In Germany, the usage still obtains, to a large extent, of an early dinner and a supper. One o'clock is a usual dinner-hour, and even the court hour has hardly advanced beyond three and four. In Vienna and some parts of Germany, it is not uncommon to have five meals a day—breakfast, luncheon, dinner, tea, and supper.

MEALIES, n. plu. *mē'liz:* a s. African name for Indian corn or maize.

MEAL'-TUB PLOT: in English history, a conspiracy, 1679, against James, Duke of York. The paper on which the scheme was written was hidden in a meal-tub; hence the name. The leader, Dangerfield, finally confessed to forgery of the papers, and was severely punished.

MEAL'-WORM: larva of *Tenebrio molitor*, coleopterous insect of a genus allied to *Blaps* (q.v.), but possessing wings and wing-covers. The perfect insect is of pitchy or dark chestnut color, smooth, about half an inch long, with short 11-jointed antennæ, and stout legs. The insect is most active in the evening. In some countries it infests granaries, mills, and houses in which stores of meal or flour are kept, as its eggs are deposited among these substances, on which the larva feeds, often doing much injury. Stores of ship-biscuit often suffer from this cause. The larva is about an inch long, thin and

round, of ochreous color, with bright rusty bands, very smooth and glossy, with six small feet and two very short antennæ.—Another species, *T. obscurus*, occasionally is found in American flour, and has thereby been introduced into Britain. This insect is of dull black color above; the under parts, legs, and antennæ, chestnut. The larva is shining and pale brown.—Cleanliness and care are the best preventives. Meal-worms are a favorite and excellent food of caged nightingales.

MEALY-BUG: a scaleless scale insect of the genus *Dactylopius* and family *Coccidæ*. These insects are covered with a mealy, or waxy substance which they secrete for protective purposes. Like their relatives, the true scale insects, they also secrete honey-dew and are attended and transported by ants; unlike these relatives they do not lose the power of locomotion. The species are most numerous in tropical and sub-tropical countries; one species (*D. citri*) being the best known outdoor species in the United States, feeding upon citrus trees in Florida. In greenhouses another species (*D. destructor*) is often troublesome. Owing to the protective covering difficulty has been met in ridding plants of these creatures, but fumigation and caustic solutions have been tried with most satisfactory results. See INSECTICIDE.

MEAN, a. *mēn* [OHG. *main*, a spot, a stain, impure: Lap. *maine*, a bodily failing, sickness: Icel. *mein*, sore, injury: AS. *gemæne;* Ger. *gemein*, common: comp. Gael. *mion*, small, mean]: low-minded; base; wanting in dignity or honor; low in rank or birth; poor; pitiful; stingy. MEANLY, ad. *mēn'lī*, moderately; without dignity; without respect. MEAN'NESS, n. *-nĕs*, low state; poorness; want of dignity or excellence; want of liberality. MEAN-SPIRITED, having a low, grovelling, and abject disposition. MEAN EFFECTIVE PRESSURE, the power exerted by the expansive energy of a gas in driving the piston of an engine. Being variable for different positions of the piston, the value determined is the average of the pressures at the various positions. It is usually determined by the use of an indicator or pressure gauge diagram. MEAN ERROR, see OBSERVATION, ERRORS OF. MEAN VARIATION, see OBSERVATION, ERRORS OF.—SYN. of 'mean': vile; low; ignoble; abject; humble; beggarly; degraded; wretched; paltry; sordid; degenerate; servile; vulgar; spiritless; menial; penurious; niggardly; groveling; dishonorable; slavish; disgraceful; despicable; shameful; contemptible; ungenerous.

MEAN, n. *mēn* [OF. *meien;* F. *moyen*, mean intermediate—from L. *mĕdĭānus*, extended, middle—from *mĕdĭŭs*, middle: comp. Gael. *meadhon*, the middle]: at an equal distance from the extremes; moderate; without excess; intermediate: N. the middle point or place; in *math.*, the average or resultant value; the middle rate or degree: specifically, a term interpolated between two terms of a

series, and consequently intermediate in magnitude. The *Geometric Mean* (q.v.) of two numbers is always less than their *Arithmetical Mean* (q.v.), and greater than their *Harmonic Mean;* and the geometric mean is itself a geometric mean between the other two. MEAN, in *OE.*, the tenor part of a musical composition. MEANS, n. sing. or plu. *mēnz,* the intermediate operations between the agent and the object to be accomplished; that which is used to effect an end; instrument of acting or effecting; resources; income, or that by which we live; the middle terms of a proportion where the *first* is to the *second* as the *third* is to the *fourth.* BY ALL MEANS, certainly; without fail. BY NO MEANS, not in any way. BY ANY MEANS, in any way. THE MEANTIME, the time between the present and that when the thing spoken of is to be done. MEANTIME, ad. *mēn'tīm,* or MEANWHILE, ad. *mēn'hwīl,* in the intervening time; for the present time MEAN TIME, time as measured by a perfect clock, or as reckoned on the supposition that all the days of the year are of a uniform length.

MEAN, v. *mēn* [Goth. *munan,* to think, to intend: Gael. *minich,* to explain: Icel. *muna,* to remember: Ger. *meinen;* Dut. *meenen,* to think; comp. L. *meminis'sĕ,* to remember]: to intend, purpose, or design; to signify. MEAN'ING, imp.: ADJ. significant: N. purpose; intention; aim, whether in the mind only or expressed; the sense, as of words or expressions; signification; import. MEANT, pt. and pp. *mĕnt,* did mean. MEAN'INGLESS, a. *-lĕs,* devoid of meaning. MEAN'INGLY, ad. *-lĭ,* significantly.—SYN. of 'mean, v.': to intend; purpose; design; signify; indicate; import; denote.

MEANDER, n. *mē-ăn'dėr* [L. *Mœander;* Gr. *Maiandros,* the name of a winding river in Phrygia]: a winding course; a winding or turning in a passage or current: V. to wind or flow round; to flow in a winding course or passage. MEAN'DERING, imp. *-dėr-ĭng:* ADJ. winding in its course or current: N. a winding course. MEAN'DERED, pp. *-dėrd.* MEAN'DRIAN, a. *-drĭ-ăn,* having many turns. MEANDRINA, *n. mē'ăn-drī'nă,* large hemispherical corals having their surfaces covered with serpentine ridges and depressions, resembling the convolutions of the human brain.

MEARIM, *mā-â-rēng'* (or MIARIM, *mē-â-rēng'*) RIVER: same as the Maranhao river; rising in the Brazilian province of Maranhao (q.v.), and flowing n. into the bay of São Marcos, about 350 m. Its current is remarkably strong; and its resistance to the ocean tide is prolonged, yielding at last to a swift upward rush of the waters with a great roar. It is navigable. The chief of its many affluents is the Pindare.

MEASLES, n. plu. *mē'zlz* [Dut. *mæselen,* measles—from *maese,* a spot, a stain: OHG. *másá,* a spot, the mark of a wound]: disease manifested by a crimson rash on

the skin, affecting chiefly children; a disease of swine and trees. MEASLED, a. *mē'zld*, infected or spotted with measles. MEASLY, a. *mē'zlĭ*, infected with measles or eruptions, as swine; applied to pork containing the parasite *Cysticer'cus cellulo'sŭs*. *Note.*—OF. *mesel*, a leper—from L. *misellus*, wretched, unfortunate—from L. *miser*, wretched, is not an etymon of *measles*, but of OE. *mesel*, which uniformly signifies 'leper.' See SKEAT.

MEASLES: a contagious, eruptive fever, accompanied with coryza and catarrhal symptoms. Children are usually the subjects of its attack; but when adults suffer, they do so severely. Like scarlatina and smallpox, it is highly contagious, often epidemic, and generally attacks the same person but once. No susceptible person can remain in the same room or house with an infected person without risk of taking the disease. It is almost impossible to isolate the infection in large establishments or schools, and it is altogether too late to expect to prevent its spread to others, if on the outbreak of the disease in a family the unaffected members had been with those who were ill, before the actual appearance of the rash. To send pupils home is thus widely to extend the probability of infection. The clothes of children have been sent home from schools where the disease had raged, and have communicated the disease, and susceptible children have also contracted the disease by lying in a bed or occupying a room shortly after it had been used by a patient suffering from measles. The contagion from measles ceases only when complete scaling off of the skin has taken place.

Measles passes through its course by four principal stages: the period of incubation, lasting all the way from five to twenty-one days, but more commonly being from ten to fourteen days; the precursory fever; the eruptive stage, and the decline. The peculiarity of the early symptoms is that they resemble those of a common cold—sneezing, red, swollen, and watery eyes, discharge from the nose, a hoarse, harsh cough, languor, fever, vomiting, and sometimes diarrhea. The symptoms usually increase in intensity until the fourth day, when the eruption appears, first on the face, then on the neck and breast, and soon after on the whole body. It is in the form of slightly raised red spots, which multiply and coalesce into blotches of a more or less crescentic form, particularly on the face, which is often a good deal swollen. An abundant eruption is more favorable than a scanty one. The eruption is two or three days in coming out, and remains at least three days. The fever then abates and the eruption declines, becoming brown as it fades, and the dry skin is afterwards thrown off, like fine bran. As the rash declines diarrhea sometimes occurs, but this, unless very troublesome, should not be interfered with, as it is often beneficial. The maximum temperature is about 103°, and if it rises much above this

the case must be regarded as severe. The highest temperature is generally reached on the fourth or fifth day, after which it rapidly declines. In nearly every case catarrhal inflammation extends into the larger bronchial tubes, and any sudden rise in the temperature or an occurrence of rigors usually indicates the advent of a more serious condition than the mere catarrh, either pneumonia or acute bronchitis.

One of the earliest symptoms that may be noticed, even before the onset of the catarrhal symptoms, is the appearance of red spots on the soft palate, that is, in the roof of the mouth, a little back of the front teeth, especially on the uvula (the lower end of the soft palate). As measles and scarlet fever are occasionally mistaken one for the other, in the early stages, the following table of comparative symptoms may be useful:

Measles.	*Scarlet Fever.*
1. Catarrhal symptoms are prominent with watery discharge from the eyes and nose, sneezing, a hoarse, harsh cough.	1. Catarrhal symptoms are usually absent, but there is great heat of the skin, sore throat, and sometimes delirium.
2. The rash is of a pinkish red or raspberry color. The white streak produced by the back of the nail, when drawn on the skin, is not uniform, and lasts a shorter time than in scarlet fever.	2. The eruption is of a bright scarlet color, and by drawing the back of the nail over the skin a white streak is produced, which lasts one or two minutes.
3. The eruption is rough, so as to be felt by passing the hand over the skin, and is in groups of a crescentic form.	3. The rash usually presents no inequalities to sight or touch, and is so minute and closely crowded as to give the skin a uniform red appearance.
4. Inflamed, red, watery-looking eyes.	4. A peculiar brilliant stare, as if the eyes were glistened by a bright light.
5. The cuticle is thrown off in minute portions, like scales of fine bran.	5. When the skin peels off it is in large patches, especially from the hands and feet.
6. The most common complications are: diseases of the lungs, eyes, ears, and skin.	6. The most frequent complications are: dropsy, noticed by puffiness about the eyes first, also swelling of the glands, especially about the neck and below the jaw.

In the usual course of measles the rash begins to fade about the seventh day of fever, and by the end of ten or fourteen days all of the symptoms have generally disappeared, with the exception, perhaps, that there may be a blotchy appearance of the skin for some time after, especially on exposure to cold. While this is the course of an ordinary case of measles, however, there are many that leave some complications remaining for a long while, the chief amongst which are a chronic cough, or a resultant bronchial catarrh, an inflammation of the eyes, especially about the eyelids, which is sometimes very persistent. Another complication will sometimes be an inflammation of the middle ear, followed by suppuration,

and a chronic discharge from one or both ears. Most of these complications may be traced back to one of two things, either the patient has unfortunately taken cold during the eruptive stage, or else there is present a more or less scrofulous condition, predisposing to disturbances of the glandular system. Pulmonary tuberculosis not infrequently follows an attack of measles; the explanation of this is that the bronchial catarrh following measles makes the patient more liable to infection upon exposure to the tubercle bacillus. These facts should emphasize the care that must be exercised under the advice of a competent physician, to prevent any complications during or following an attack of measles.

MEASURE, n. *mĕzh'ûr* [F. *mesure;* Sp. *mesura,* measure—from L. *mensūră,* a measure: comp. Gael. *meidh,* to measure: see METE]: whole extent or dimensions of a thing; the unit or standard by which the extent or volume of anything is ascertained; in *arith.,* a divisor that leaves no remainder; settled or stated quantity; limit; degree, as in some measure; allotment; moderation; meter in poetry; movement regulated by the time of music; stately dance; the division of the time by which the air and motion of music are regulated (see MEASURE, in Music): any act by which a final object or end may be attained, as a legislative *measure:* V. to compute or ascertain the extent, size, or capacity of anything by means of a certain unit or standard; to judge of quantity, extent, or greatness; to proportion; to be of a certain extent. MEAS'URING, imp.: ADJ. used in taking the measure or extent. MEASURED, pp. *mĕzh'û-rd:* ADJ. uniform; steady; limited or restricted. MEAS'URES, n. plu. means to an end; proceedings; in *geol.,* beds of strata, as those containing coal; standards or definite units of capacity or extent (see WEIGHTS AND MEASURES; METRIC SYSTEM). MEAS'URER, n. *-û-rĕr,* one who measures. MEAS'URABLE, a. *-û-ră-bl,* that may be measured. MEAS'URABLY, ad. *-blĭ.* MEAS'URABLENESS, n. *-bl-nĕs,* the quality of being measurable. MEAS'URELESS, a. *-lĕs,* that cannot be measured; immense. MEAS'UREMENT, n. *-mĕnt,* the act of measuring; the result of measuring. TO HAVE HARD MEASURE, to be harshly or oppressively dealt with. TO TAKE MEASURES, to begin proceedings to accomplish an object in view. IN MEASURE, in moderation. WITHOUT MEASURE, unlimited in quantity or amount.—SYN. of 'measure, n.': rule; proportion; quantity; portion; boundary; meter; tune; mean;—of 'measureless': unlimited; endless; unbounded; boundless; immeasurable; infinite; limitless; vast.

MEASURE: a definite unit of capacity or extent, fixed by law or custom, by which relative sizes and capacities are ascertained and expressed; as, a yard, a measure of length; a gallon, a measure of capacity; a square foot, a measure of area; a cubic foot, a measure of volume, etc. See WEIGHTS AND MEASURES.

Lineal Measure.—The measure of lines or distances; the standard unit of lineal measure in the United States is the yard. The system is based on the law of nature that the force of gravity is constant at the same point of the earth's surface, and consequently that the length of a pendulum which oscillates a certain number of times in a given period is also constant.

Unit of Measure.—A given quantity, used as a standard of comparison in measuring a quantity of the same kind. Every kind of quantity has its own unit of measure, and under different circumstances the same kind of quantity may have different units of measure.

Line of Measures.—The line of intersection of the primitive plane, with a plane passing through the axis of the primitive circle and the axis of the circle to be projected.

Measure of Angles.—The right angle being taken as the angular unit, its subdivisions are degrees, minutes and seconds. The right angle contains 90 degrees, the degree 60 minutes, and the minute 60 seconds. All smaller fractions are expressed decimally in terms of the second.

Measure of Magnification.—The measure of magnification, or magnifying power of any optical instrument, is the ratio of the magnitude of the image to the magnitude of the object, or more precisely, the ratio of the apparent diameter of the image to that of the object.

Measure of a Ratio.—Its logarithm, in any system of logarithms, or the exponent of the power to which the ratio is equal, the exponent of some given ratio being assumed as unity.

In Music.—The quantity of notes which are placed in the bar, and which is generally called the time, of which there are but two kinds, namely, common time, containing an equal quantity of notes in the bar, and triple time, containing an unequal quantity. Common time is generally marked with a C at the beginning, which means that every bar contains four crotchets, or their value in other notes. There are also other kinds of common time which are marked $\frac{2}{4}$, $\frac{6}{4}$, $\frac{6}{8}$. Triple time is marked $\frac{3}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{9}{8}$, $\frac{9}{4}$.

MEASUREMENT OF STREAMS: one of the many useful classes of work conducted by the United States Geological Survey; the measurement of streams having an industrial value. Wherever water is likely to be employed for power or irrigation the amount available is ascertained by that bureau. The volume varies greatly from season to season, and sometimes from year to year. Any calculation by the manufacturer or farmer which does not take this variability into account would be misleading. Moreover, streams differ among themselves in straightness, the character of their beds and other particulars. Accurate measurement is still further complicated by the lack of uniformity in the movement in a

given cross section. What might be true for one point would not be true for other points to the right or left of it, or at a higher or lower level.

The first step in the work is to place a gauge in a permanent position, and employ a suitable observer to read it every day. The gauge is graduated to feet and tenths. Usually it is upright. It may be laid over slanting, however. In that case, the spacing is widened, so as to give accurate results. One observation a day is made, and its result is transmitted on a postal card to Washington. The second factor in the hydrographer's computation is the velocity of the stream, at different heights. To ascertain this only occasional measurements are necessary. These are made by experts, but with their aid it is possible to prepare tables showing the total discharge of that particular stream for all the different gauge readings. After such tabulation is effected the maximum, minimum and mean flow for any month in the year can be told at a glance.

Velocity is ascertained with a meter lowered into the water. The instrument contains a tiny screw propeller, the number of whose rotations under the pressure of the fluid is automatically registered. Many types of meter have been devised. The kind which the bureau prefers has an electric wire leading up to a buzzer in the operator's pocket. There a click or other audible sound indicates to him the speed of the screw. He counts the number of revolutions for some definite period, usually fifty seconds, records it in his notebook, and moves along a short distance to make another observation.

If measurements are made at various depths along a vertical line, the results will not be equal. For this reason hydrographers have studied to find, if possible, a level that would fairly represent the average velocity for any vertical. In this way they can simplify the labor. It has been found that such an average can be secured by taking the speed at a depth of from six-tenths to two-thirds of the way down from the surface. To obtain a correct idea for the whole stream, though, these tests must be made at a number of places between one shore and the other. No measurement at a single point can be trusted to be fairly representative.

MEASURING WORM, INCH WORM, LOOPER, or SPANWORM: a caterpillar of any species of moth of the superfamily *Geometridæ*. The creatures are characterized by the presence of only two pairs of abdominal legs, one upon the ninth, the other upon the anal segment, and by their peculiar form of locomotion, the rear of the body being brought forward toward the front legs and the body forming a loop at right angles to the surface upon which the insects walk. Nearly all the numerous species feed upon foliage, a few upon seeds in which they bore. Some are considered serious pests in orchards and upon shade trees; for instance, the canker worms (see APPLE),

the lime-tree moth (*Hybernia tiliaria*), and *Cymatophora pampinaria*, which sometimes devastates cranberry plantations. The duration of the larva state is variable; from their great voracity they grow rapidly and shed their skins several times before attaining maturity; when arrived at this state they seek some sheltered spot in which to undergo the change to pupa form, some clinging to the lower surfaces of leaves while others bury themselves in the earth, those remaining in the air suspending themselves in various ways by means of their silky secretions, others enclosing themselves in silky cocoons. Those burying themselves also build cocoons around them, but many of these only line their cavity with enough silken threads to keep the wall from falling in. One of the European species, *Fidonia Plumistaria*, is distinguished by curious feathery antennæ. The caterpillars of this species are very injurious to fruit trees, especially those of the European magpie moth, *Abraxas grossulariata*, which inhabit gooseberry bushes, often entirely stripping them of their foliage. The caterpillar of the American canker worm moth, *A. nisopteryx pometaria*, also belongs to this species of worm, the eggs being hatched in the spring; when grown they are about an inch long and of various colors, and are also dangerous to orchards. Most of the species, however, are of small economic importance. The caterpillars usually resemble twigs when at rest, their protective coloring and their attitudes serving to deceive their enemies. The caterpillars of a few species of the owlet-moths, family *Noctuidæ*, walk in this way, since they also lack prolegs upon the middle abdominal segments. They are not, however, considered true measuring worms. The geometrid moths are usually of small size and inconspicuous but delicate and beautiful coloration. Consult: Holland, *The Moth Book* (New York 1903); and Packard's *Monograph of the Geometridæ*, with colored plates, published by the U. S. Geological Survey in 1876.

MEAT, n. *mēt* [Goth. *mats*, food; *matjan*, to take food: Icel. *mata*, food: F. *mets*, a mess, a dish of food]: food in general; anything eaten for nourishment; flesh of animals, to which the word is now generally restricted. MEAT-OFFERING, an offering consisting of meat or food. MEAT-SALESMAN, an agent in a town who receives and sells the carcasses of cattle, sheep, and the like, sent to him by country dealers. SWEETMEATS: see under SWEET.

MEAT EXTRACT: preparation of the essential life-supporting constituents of meat, separated by a process of infusion, straining, and evaporation, which removes the fat, and the bulk of the albumen, gelatine, and water. For a different preparation, see BEEF-TEA. The method of making meat extract is as follows: From a certain quantity of fresh beef every particle of fat, bone, and tendon is carefully removed. It is then chopped up and placed in a vessel, with a small quantity of water, in a

water-bath, great care being taken to remove the albuminous coagulation which forms, as well as any fatty matter which may show itself. After a time a pale-brown, thickish fluid, of the consistency of treacle, will be found in the vessel. This is pure meat extract. It is poured off, leaving behind all the fibrous remains. That the good of the meat is largely in the extract is shown by the fact that no animal will readily eat the residue, and a dog forced by hunger to do so will starve without other food. One pound of extract contains the essence of 32 pounds of beef. It will keep for years, only covered with a piece of writing-paper, as is done with jellies. So agreeable to the taste is pure meat extract that persons who have taken it in their invalid state often continue its use after recovery. For the invalid it has a wonderfully restorative effect, having extraordinary power to promote the assimilation of food. Even in cases of gastric fever, when, from the nature of the disease, the stomach is peculiarly unfitted to support food, the pure meat extract is found grateful, exhilarating, and strength-giving. In hospital use it is found that the convalescence of patients suffering from typhus is accelerated by the use of meat extract, so much so as to be more economical than fresh meat, though its first cost in material is much greater. On the battle-field and in severe surgical operations, it has excellent sustaining effect. The contrast between the constituents of flesh and those of the meat extract prepared from it is as follows: In 100 parts of beef are contained 50 parts of water, 30 of fat, 7 of gelatine, 4 of fibrine, and 4 of albumen. In 100 parts of meat extract are contained 51 parts of chemical compounds known as creatine, creatinine, inosic acid, osmazome, etc., 21 of mineral matters, 17 of water, 8 of gelatine, and 3 of albumen.

MEATH, *mēth:* maritime county of the province of Leinster, Ireland; bounded e. by the Irish Sea and the county of Dublin; area, 906 sq.m. Pop. (1901) 67,497. The soil is a rich loam, and extremely fertile; but it has long been used almost entirely for pasture. The surface is mostly an undulating level, forming the e. extremity of the great limestone plain of Ireland and rising slightly toward the n. and n.w. No minerals of importance are found. The chief rivers are the Boyne and Blackwater. The principal towns are Trim, Navan, and Kells, in the first of which the assizes are held. Meath possesses abundant means of communication, being intersected by numerous roads and several railways, also by the Royal canal. The coast-line, about 10 m., has no port of importance, even as a fishing-station. The occupation of the people is almost wholly agricultural. Anciently Meath, which included West Meath, and probably portions of several other adjacent counties, formed one of the kingdoms into which Ireland was divided, the royal seat being the celebrated Temor or 'Tara of the Kings,' the scene

of the first preaching of Christianity under St. Patrick. After the English invasion Meath was early occupied by Strongbow, and was erected into a county palatine by Henry II., who conferred it on Hugh de Lacy. From this time forward it was the scene of many conflicts. In the end of the reign of Henry VIII. it was separated into E. and W. Meath. Few Irish counties present so many interesting relics of Irish antiquities of all the various periods. Celtic remains abound along the Boyne and Blackwater. The earthworks of the ancient royal seat at Tara are still discernible, and some valuable and highly characteristic gold ornaments were there discovered. John's castle at Trim is one of the most extensive monuments of English rule in Ireland. The round tower and sculptured crosses of Kells are singularly interesting; and almost every parish in the county contains some relic of the feudal or ecclesiastical structures which formerly covered the land.

MEATUS, n. *mē-ā′tŭs* [L. *mĕātus*, a going, a passing]: in *anat.*, a natural passage or canal, wider than a duct. MEATAL, a. *mē-ā′tăl*, of or pertaining to the meatus.

MECCA, *mĕk′a* (*Om Al Kora*, Mother of Cities): one of the oldest towns of Arabia, cap. of the province of Hedjaz, and, as birthplace of Mohammed, the central and most holy city of all Islam. It is in 21° 30′ n. lat., and 40° 8′ e. long., 245 m. s. of Medina, about 65 m. e. of Jiddah, the well-known port on the Red Sea, in a narrow, barren valley, surrounded by bare hills and sandy plains, and watered by the brook Wadi-Al-Tarafeyn. The city is about 1,500 paces long and about 650 broad, and is divided into the Upper and Lower City, with about 25 chief precincts. The streets are broad and rather regular, but unpaved; excessively dusty in summer, and muddy in the rainy season. The houses, three or four stories high, are of brick or stone, ornamented with paintings, and their windows open on the streets. The rooms are much more handsomely furnished and altogether in a better state than is usual in the East; the inhabitants of Mecca making their living chiefly by letting them to the pilgrims (see HAJJ) who flock hither to visit the Beit Ullah (House of God), or chief mosque, containing the Kaaba (q.v.). This mosque, capable of holding about 35,000 persons, is surrounded by 19 gates surmounted by seven minarets, and contains several rows of pillars, about 20 ft. high and about 18 inches in diameter, of marble, granite, porphyry, and common sandstone, which at certain distances are surmounted by small domes. A great number of people are attached to the mosque in some kind of ecclesiastical capacity, as katibs, muftis, mueddins, etc. No other public place or building, sacred or profane, of any importance, is to be found in this city, which also is singularly destitute of trees and verdure of any kind. It is protected by three castellated buildings, and is governed by a sheriff. The

population has, in consequence of the rapidly decreasing number of pilgrims, fallen off considerably of late, from more than 100,000 to hardly 40,000, who do not find the 100,000 annual pilgrims sufficient to keep them in the prosperity of former years. The trade and commerce of M. are insignificant; the chief articles manufactured there are chaplets for the pious pilgrims. The townspeople themselves are lively, polished, and frivolous, and, growing up amid an immense concourse of strangers from all parts of Asia, are generally able to converse in three or four eastern languages. The citizens do not bear a good repute for character, and M. is the well-known scene of scandalous vices. Respecting the history of M., it was known to Ptolemy as Macoraba, and first belonged to the tribe of the Kosaites, later to the Koreish. Mohammed, who had been obliged to leave it precipitately 622 (see HEGIRA), returned and conquered it 627. M. was taken by the Wahabites (1803), but given up again to the pasha of Egypt, Mehemed Ali (1833), whose son, Ibrahim, was made Sheik El Haram—'of the Sacred Place.' At present, however, M. is directly dependent on the sultan.

MEC'CA, BALM OF: balsam made from a plant, *Besem*, which grows abundantly near the city of Mecca: see BALSAM, or BALM OF GILEAD.

MECHANIC, a. *mĕ-kăn'ĭk*, generally MECHAN'ICAL, a. *-ĭ-kăl* [L. *mechanĭcus;* Gr. *mechanĭkos*, of or belonging to mechanics—from Gr. *mechănē*, a machine: F. *mécanique*]: pertaining to machines or to the principles of mechanics; constructed or performed according to the laws of mechanics; physical, or not chemical; manual, or not mental; done by a machine; pertaining to artisans; done by mere force of habit; in *OE.*, mean, servile. MECHAN'ICAL, a. acting without intelligence or design. MECHAN'ICALLY, ad. *-kăl-lĭ*, without intelligence or design. MECHAN'ICALNESS, n. *-nĕs*, the state of being mechanical. MECHANIC, n. *mĕ-kăn'ĭk*, a skilled workman; an artisan. MECHANICIAN, n. *mĕk'ăn-ĭsh'ăn*, one skilled in mechanics; a machine-maker. MECHANICS, n. plu. *mĕ-kăn'ĭks*, science of the forces and powers and of their action on bodies, either directly or by the intervention of machinery (see below). MECHANISM, n. *mĕk'ăn-ĭzm*, the structure of the parts of a machine, and the manner in which these are put together to answer its design; the parts composing a machine; action according to mechanic laws. MECH'ANIST, n. *-ĭst*, one skilled in the structure of machines; one of a sect of philosophers who refer all the changes in the universe to the effect of the mechanical forces. MECHANICAL CALCULATION (see CALCULATING MACHINE). MECHANICAL PHILOSOPHY, that philosophy which explains the phenomena of nature on the principles of mechanics; the result of observation and experiment. MECHANICAL POWERS, the simple instruments entering into the construction of every machine, however complicated (see below). MECHANICAL SOLUTION, the solution of a prob-

lem by any contrivance not strictly geometrical, as by means of the ruler and compasses.—SYN. of 'mechanic,' n.; workman; operative; artificer; artist; machinist; mechanician; manufacturer.

MECHANICAL DRAWING. In making drawings of machines, buildings, bridges and other structures, for the use of the men who are to make the parts and put them together, the ordinary perspective drawing is of little value, and there has been developed a method of drawing based upon *projection*, in which sketches are made, in exact proportion to the measurements, without reference to perspective. In other words, objects are drawn in outline dimensions, as they are, and not as they appear to the eye. Men who do this work are termed *draftsmen*, and they do more or less designing, producing (by mechanical drawing) pictures of a structure, that cover every detail, and which furnish such complete information that a workman can make the structure exactly as designed, with no other guide than the drawings. The system provides a language that can be read and comprehended far better than could any written description of the objects designed.

The working materials of the draftsman include a smooth board, which is often a table with a top that may be inclined at any convenient angle for drawing. The drawing sheet is fixed on this board with thumb-tacks. The T-square has a long body designed to rest on the drawing board, and serve as a ruler for drawing

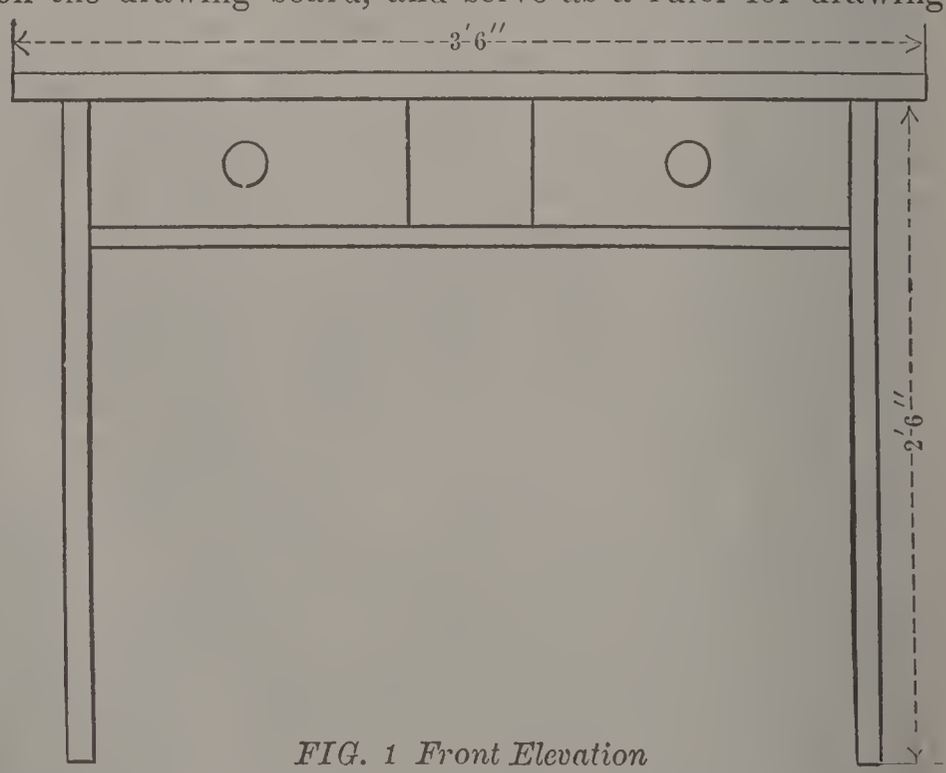


FIG. 1 Front Elevation

straight lines. The cross-piece forming the top of the T is formed so as to engage the edge of the drawing board, and so insure the lines being parallel to the sheet and to each other. A three-sided foot rule with graduations along six surfaces is used in preference to the ordinary flat ruler for measuring. The protractor,

for laying off angles, consists usually of a graduated arc (that is a half circle marked off in degrees), and a radial arm. This is for drawing lines at angles. A thin, flat right-angled triangle is used for drawing right angles, which are the most common. Another flat, thin instrument is called the irregular curve, which describes its use. A set of compasses for drawing circles, and an outfit of suitable pencils and pens, completes the equipment.

The draftsman usually makes several drawings of the object designed, presenting its different sides, its top, and a cross-section. A view from the side is termed an *elevation;* a view from the top, looking downward, is a *plan,* and a *section* or *cross-section* is an imaginary view of the object as though it were sliced in two, showing the parts in the rear of the slice.

To illustrate the principle it is well to take a very simple subject, familiar to all. A table might be represented as below.

This front elevation (Fig. 1) gives the builder information as to all the front dimensions, which can be had by measuring, or which may also be written on the drawing as indicated.

The end elevation shows one of the drawers partly

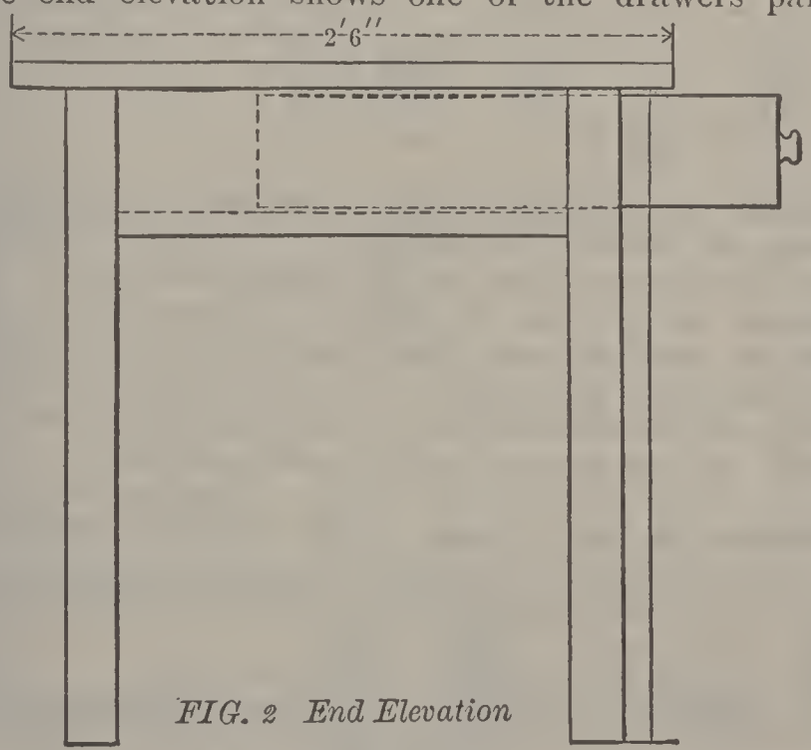


FIG. 2 End Elevation

open, that part within the table, hidden from view, being in dotted lines, to show that it is beyond.

The plan or view from overhead, looking down, shows in dotted lines the parts of the inside framing and their dimensions, the thickness of the sides of the drawers, etc.

The section (Fig. 4) which is across the table at A--A, gives another view of the inside framing and supports for the drawers. The four views cover all the information as to the dimensions and relative positions

of all the parts of the table. In the case of complicated machines with much detail, more drawings are required, as rear elevations, and cross-section taken along other lines, and numerous details of the various parts in different positions.

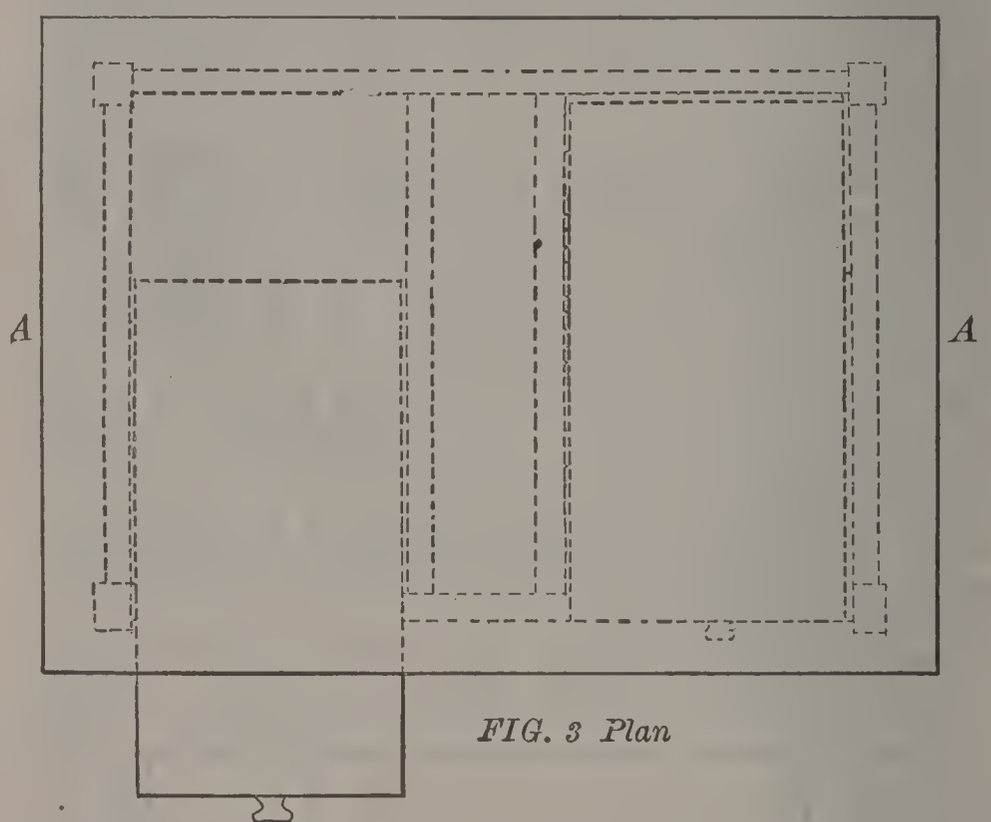


FIG. 3 Plan

Several conventional methods are used in mechanical drawing to convey information. As already indicated, a dotted line is given as the representation of that which is covered up or invisible. Center lines, from which to measure, are often employed, and are given with long and short dashes: ——— – ——— – ——— – ——— –. Dimension lines have long dashes of even length, with a pointer or V at each end, as ——— ——— ——— ——— ——— . The apex of the V indicates the point from which the measurement is

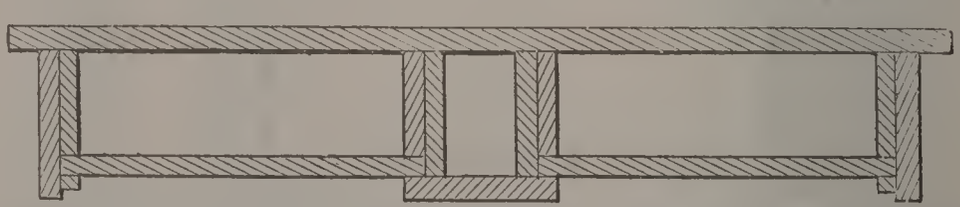


FIG. 4 Cross Section at A-A

taken. Extension side lines, to connect one part of one drawing with a similar part of another drawing on the same sheet, are formed of short rules, thus — — — — — — — —. To show the direction of motion of a part, an arrow is employed, or if the part moves two ways (reciprocates) a double arrow. See Fig. 6.

The draftsman commonly uses the sign ′ for feet and ″ for inches, and every drafting shop makes use of other signs, which vary with the nature of the work.

Solid parts shown in section are generally shaded with lines at an angle of 45°. Conventional methods of shading are employed to give information as to the material to be used in construction. (See Fig. 5.) The plain shading (a) indicates cast iron, alternate light

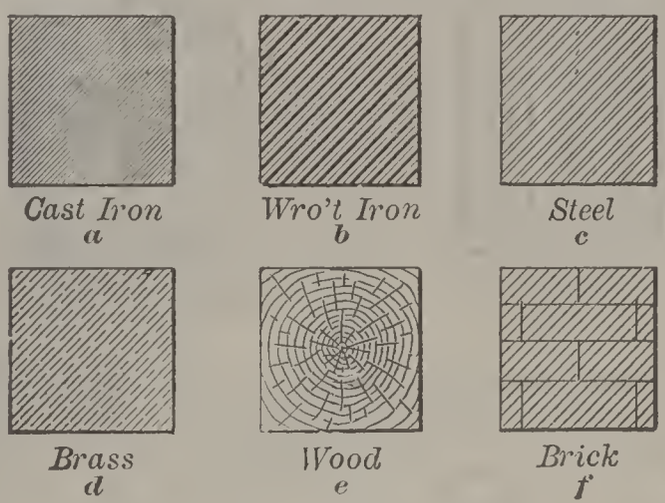


FIG. 5

and heavy lines (b) wrought iron, parallel lines (c) steel, alternate plain and dotted lines (d) brass, while wood (e) and brick (f) are illustrated by rough imitation of the grain and joints respectively.

Mechanical drawings are made either of the exact size of the object represented, or on a scale larger or smaller, as may be convenient. The great majority of subjects are made on a smaller scale, as one inch to one foot, and whatever the scale, it should be written on the margin of the drawing, or indicated by measurements.

In drawing intricate machinery, with many small moving parts, the draftsman must exercise unceasing vigilance to prevent one part coming in the space required for the movement of another part, at the same time. Since it is always desirable to condense and bring close together the parts of a machine, it is very common for moving parts to *alternately* occupy the same space, yet two objects cannot possibly occupy the same space at the same instant.

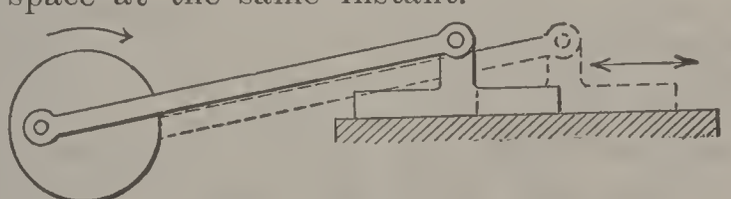


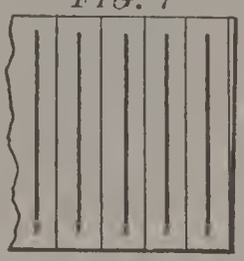
FIG. 6

To reduce the chances of interference, through an oversight, it is common to illustrate moving parts by drawing such in several positions, or as in Fig. 6, to represent a part at one extreme of its motion, and to indicate its position at the other extremity by dotted lines.

To save unnecessary labor in drawing details that are not essential the draftsman resorts to arbitrary repre-

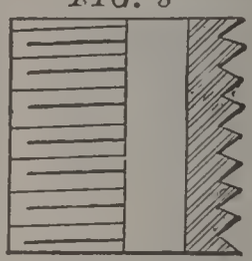
sentations of many things. For instance, he often draws a screw, as in Fig. 7, or he may show it partly in section and partly in a conventional form, as in Fig. 8, which is termed a quarter-section of a screw. This last

FIG. 7

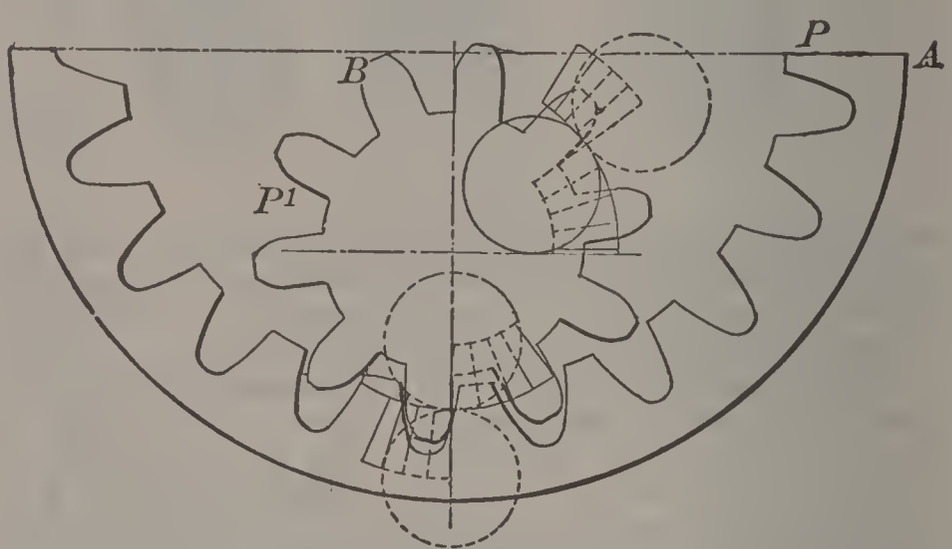


Screw

FIG. 8



Quarter Section



A Anular Gear, B Spur Gear,
P P1 Pitch Lines.
FIG. 9

is a very illustrative method. It shows the angle of the screw-threads, the number of threads to the inch, and the hollow interior.

The machine draftsman is often called upon to design gear-wheels, and it is part of his duty to arrange the teeth accurately. For instance, in Fig. 9, which shows a pinion designed to revolve within an annular gear, if the draftsman had started with too small a number of teeth on the pinion and then tried to draw the teeth of the annular gear to fit, he would have found that the teeth interfered with each other, so that the pinion would not run. He must also consider the strength required, according to the work expected of the gears. If it is heavy work, and the teeth are small, he increases the width of the face of the teeth by thickening the wheels, thus securing more metal for each tooth. At P and P′ (Fig. 9) are the pitch-lines or pitch-circles of the gears. The *pitch-line* is the imaginary line on which a gear would roll if it were simply a cylinder. It is the working diameter of the gear-wheel, on which measurements are taken to calculate the velocity, num-

ber of rotations for a given result, etc. The teeth extend half way beyond this line, and are bottomed an equal distance within it—that is theoretically—in practice there is a very minute allowance for clearness of the teeth. The teeth of opposing gears should touch at every point, but should not bind or press hard at any point.

Segment-gears (that is arcs of circles bearing teeth) present many of the same problems as gears, and have a similar pitch-line, as has also a rack. In designing two-gear wheels to work together, if A is to turn twice while B turns once, A must have just half as many teeth as B, and the distance between the teeth on each gear-wheel must be the same, measured on the pitch-circle. This distance is called the *pitch*. The distance between the threads of a screw bears the same name.

The architect, in designing a house, proceeds with the drawings very much as the machine-maker, and in the case of a small structure, such as that shown in Fig 9, would preferably make the three companion designs on one sheet, as indicated. The two elevations and the

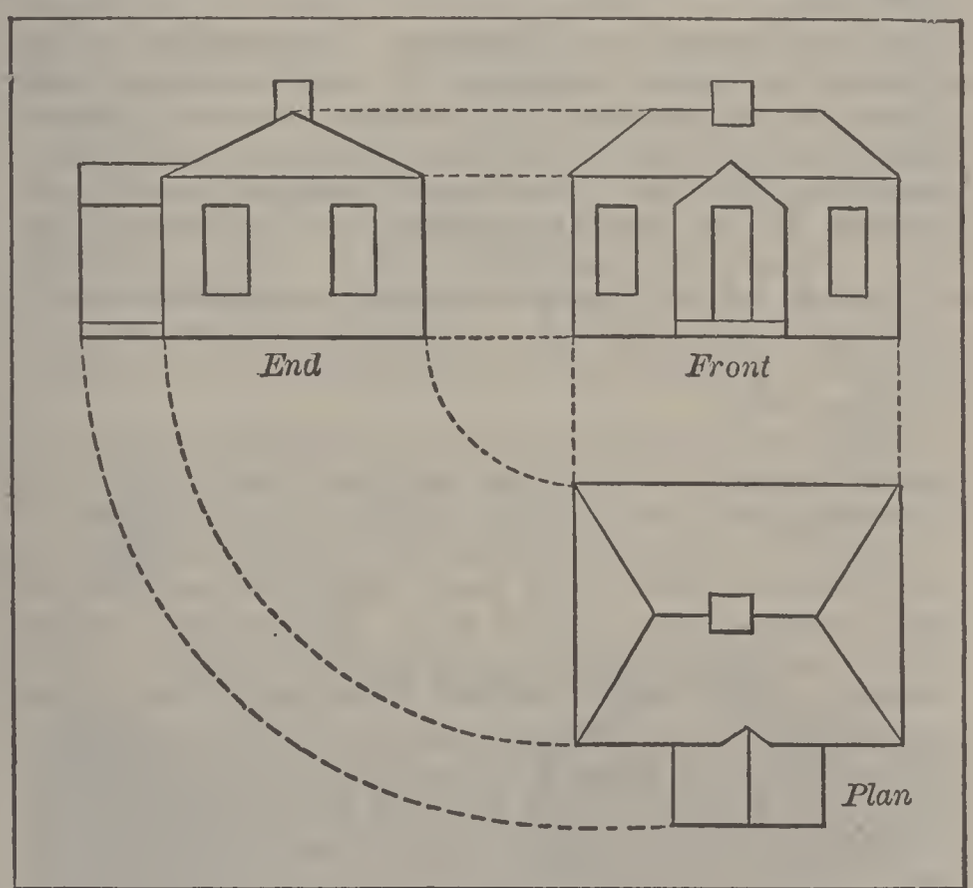


FIG. 10

plan give all the important dimensions. Of course complete drawings for a building would involve details of the framing, flooring, foundations, etc. An ordinary 2½ story dwelling might require fifty sheets of drawings to show every detail.

In making a working drawing, the draftsman first employs a hard leadpencil, making light lines, that may

be easily erased, for in laying out new work he is sure to make many changes and corrections before all is satisfactory. By proceeding in this way he can cut out and redraw many times without spoiling his sheet. When the pencil drawing is completed, he places a transparent *tracing cloth* on top, fixing it in place with thumb-tacks, so that it cannot slip, and reproduces in ink the drawing that shows through. This ink drawing may then be taken to a blue-print frame, and copies can be printed by the sun. See BLUE PRINT.

The student of mechanical drawing should begin by drawing very simple and familiar things, such as chairs, stools, bureaus, desks, anything that is at hand for examination and measurement. He may also secure blue prints from some factory or drafting office and practice copying them, or try to make a side elevation from a front elevation of a simple machine. With perseverance and natural mechanical ability, he can in time begin to design original work; but it is useless for a beginner to try and design machinery or buildings without mastering the details of drawing and construction.

MECHANICAL MOVEMENTS. All mechanical appliances or devices employed to convert power into motion, or to transmit that motion from one point to another are called mechanical movements, or sometimes mechanical motions. The term is frequently restricted, however, to the simpler combinations, having one definite purpose. The mechanism of a watch, consisting of springs which supply the power, and wheels which transmit that power in a regulated manner to move the hands around the dial, is called the "movement" of the watch.

Simple mechanical motions are straight, rotary, and helical (spiral); compound motions are obtained by combining any two or more of the simple motions.

Pendulum motion is the oscillatory motion of a body in the arc of a circle, the body being attached to a rod that vibrates from a fixed axis. In the ideal simple pendulum, consisting of a body attached to a string without weight, and vibrating from the point of suspension without resistance, a material body once set in motion would continue forever. Under these conditions it has been noted (1) that the time of the vibration of a pendulum through short arcs is independent of the lengths of the arcs, and that when the length of the arc is constant, as in the case of clock devices, the times of vibration are equal; (2) that when the force of gravity is constant, as is the case at any given point on the surface of the earth, the time of vibration varies directly as the square root of the length of the pendulum, so that, if a pendulum of a given length vibrates in one second, a pendulum one-quarter as long will vibrate in one-half second, and one four times as

long in two seconds. These facts make the pendulum suitable as a means of regulating time.

Movements embodying the principle of the lever are of three classes: (1) those in which the fulcrum is situated between the power and the weight; (2) those in which the fulcrum is at one end of the lever arm with the weight nearer to it than the power; and (3) those in which the fulcrum is at the end with the power nearer to it than the weight.

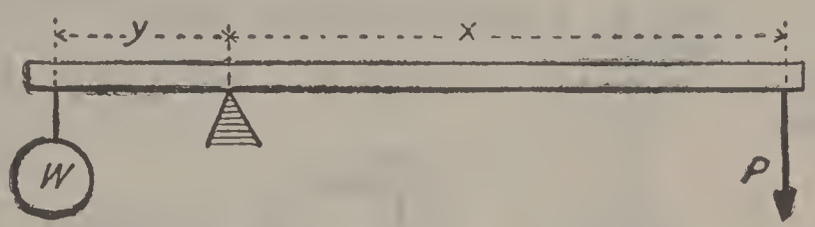


FIG. 1.— LEVER OF THE FIRST ORDER.

In the first, if the weight is nearer to the fulcrum, there is a mechanical advantage—illustrated by the crowbar, which on account of the great difference in the length of its arms, is advantageously used to overcome great resistances. Scissors and nippers are double levers of this class. If the power is nearer to the fulcrum, there is a mechanical disadvantage, and if the weight and the power are at an equal distance on either side of the fulcrum, the power is equal to the weight and gives an arrangement similar to the ordinary balance.

The distinction between the gain of power and the

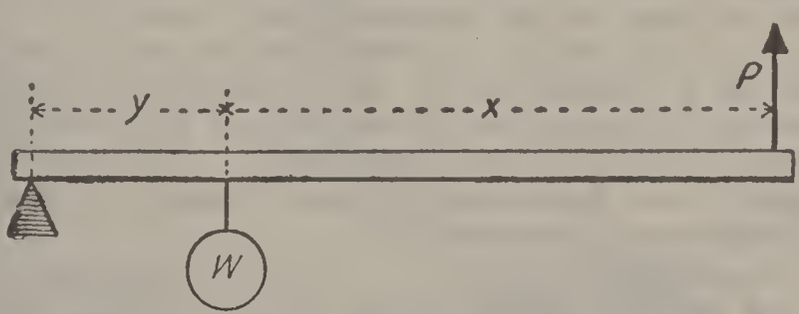


FIG. 2.— LEVER OF THE SECOND ORDER.

loss of velocity, and the reverse of these conditions, as depending upon the position of the fulcrum, is exemplified by shears used for cutting metal, and for cutting cloth, respectively. In the former, short blades with long handles overcome a great resistance slowly; in the latter, long blades operated by short handles, move quickly.

In the second class there is always a mechanical advantage. The wheelbarrow is an example of the single lever. The fulcrum is at the centre of the wheel, the weight acts downward at the centre of gravity of the load, and the power is applied at the ends of the handles. A hinged nut-cracker is an example of a double lever of this kind.

In the third class there is always a mechanical disadvantage; but, great rapidity of movement is obtained.

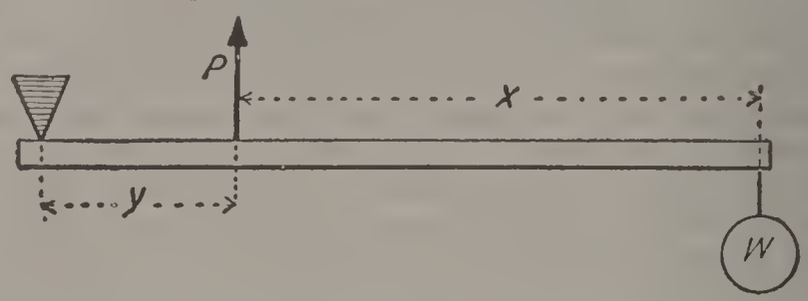


FIG. 3.— LEVER OF THE THIRD ORDER.

A pair of tongs is an example of a double lever of this class.

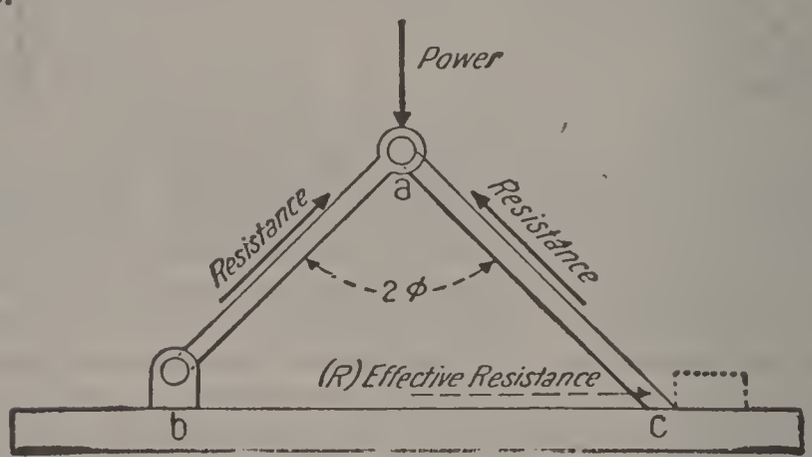


FIG. 4.— TOGGLE-JOINT.

In the toggle-joint, a movement composed of two levers hinged together at (*a*) Fig. 4, with the end at (*b*) free to turn on a fixed pivot, while the end at (*c*) is free to move in the direction (*ac*), there is a great mechanical advantage, especially when the levers are nearly in a straight line. It is frequently employed for raising the covers of carriages, and also with great efficiency in stone-crushing machinery. (For other lever movements see BALANCE, TESTING MACHINES, WATCH, and WEIGHING MACHINES.)

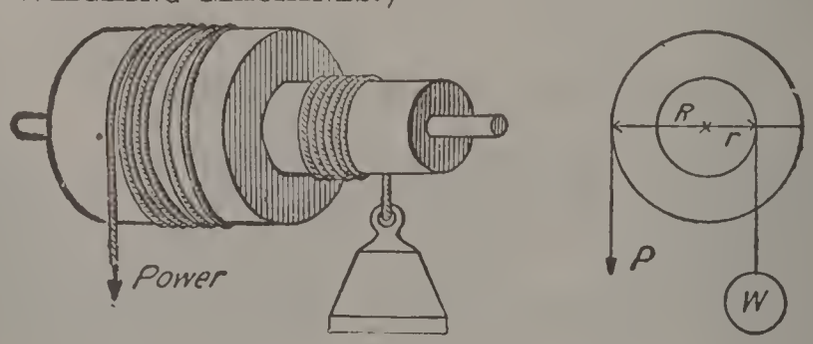


FIG. 5.

The wheel-and-axle hoisting devise (see Fig. 5) consists of two cylinders of different sizes rigidly connected together and turning about a common axis. The larger cylinder is called the wheel and the smaller the axle. The power is applied to the end of a rope wound around the wheel and the weight is raised by a rope wound around the axle. It is essentially a form of lever, and 'the power

is to the weight lifted as the radius of the axle is to the radius of the wheel.' The principle is applicable to all forms of hoisting machines, steering gear of ships, etc. The differential or 'Chinese' windlass employs two axles of different diameters (see Fig. 6). A rope passing under a *moveable* pulley is wound around the large axle, and unwound around the smaller, so that the upward movement of the weight supported by the pulley is very slow, and therefore, the mechanical advantage very great.

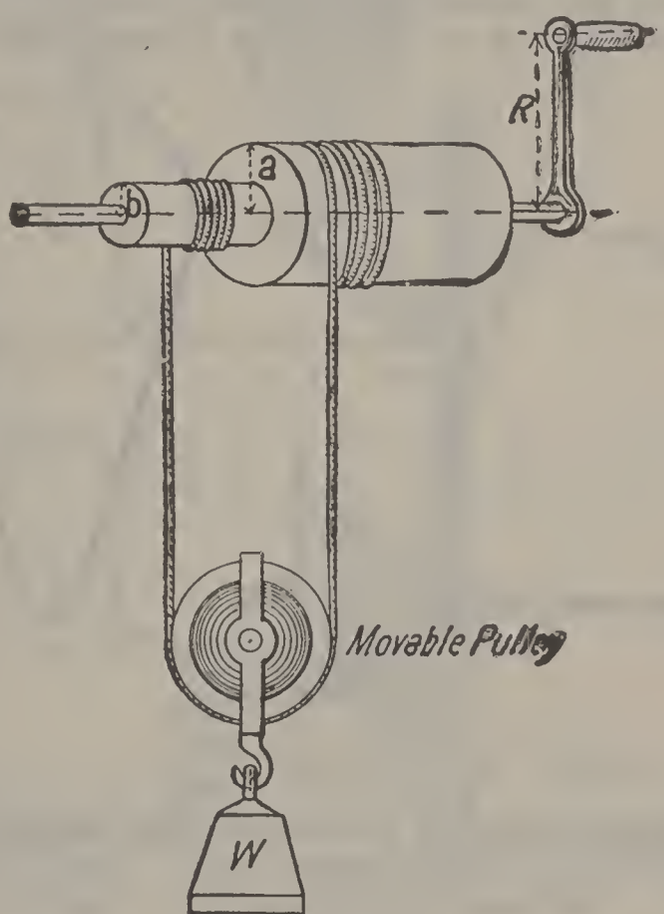


Fig. 6.

Wheel gearing consists of trains of two or more gear wheels, the teeth of which interlock so that a force applied to one is communicated to the others. With a loss of speed there is a mechanical advantage, but a gain in velocity is at the expense of power, and constitutes a mechanical disadvantage.

Trains of toothed wheels are employed in hoisting machines, and in the back-gears of large turning lathes, where a gain in power is required. They are also used extensively in the works of timepieces, but in such cases the relation of the power to the weight is not considered since the desideratum is the relative velocity of the axes of the successive wheels. The rack-and-pinion movement consists of a straight toothed-bar, the teeth of which interlock with the teeth of a gear wheel, which when turned by a handle or screw-head moves the bar up and down, or back and forth. A familiar example

is the arrangement usually employed to move the tube of a microscope up and down.

The axial motions of wheels may be communicated to each other by belts as well as by gear wheels, with or without a change of velocity. In the case of the cone-pulley (Fig. 7), when the belt passes over the smallest wheel of the lathe shaft and over the largest wheel of the power shaft, the velocity of the axis of the lathe will be the greatest and its power to overcome resistance the least, while a reversal of the belt arrangement just stated will give exactly the opposite results in the movement and power of the lathe. See WHEEL WORK.

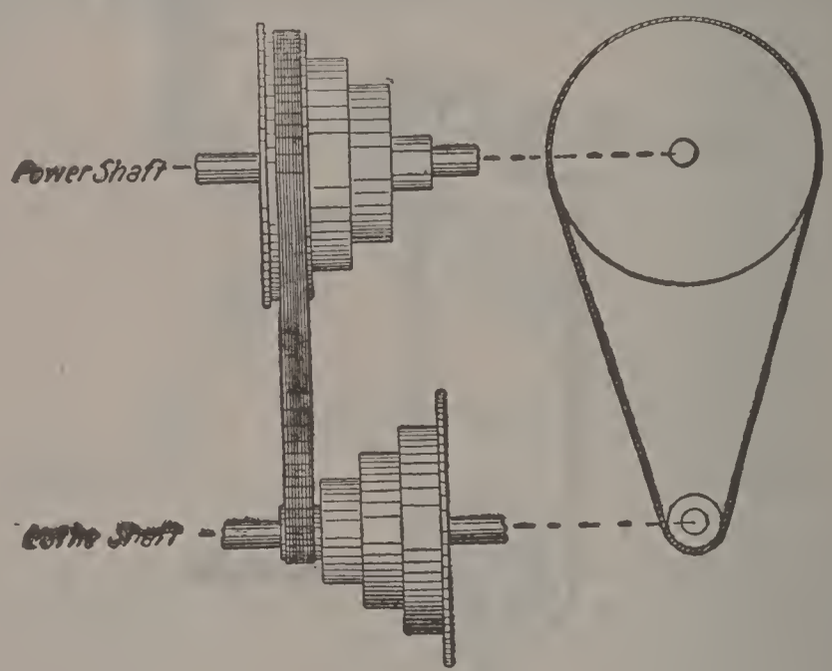


FIG. 7.

The pulley, another modification of the lever, gives a mechanical advantage under certain conditions. (See PULLEY.) Although the theoretical relation of the power to the weight is not attained in practice, since serious resistances due to friction and to the stiffness of the ropes have to be overcome, it is a very useful mechanical appliance and is extensively employed in connection with the wheel and axle, or with gear wheels, in the machinery of derricks and cranes, and also forms an important part of a ship's rigging.

The wedge is sometimes considered as a combination of two inclined planes placed base to base. (See Fig. 8.)

The power acts in a direction perpendicular to the back, and the resistances are felt in the same plane perpendicular to the sides. The thinner the wedge the easier it will drive in, but the resistance due to the friction is great. The principle is used in many forms of cutting tools such as the knife, chisel, axe, and plane. For working in comparatively soft materials, the angle is kept small and the edge sharp; but, for harder materials the angle is increased. Metal-planing tools have very large angles, ranging from 60° to 80°. See WEDGE.

The screw is essentially an inclined plane wound spirally around a cylinder, as a groove (Fig. 9). When

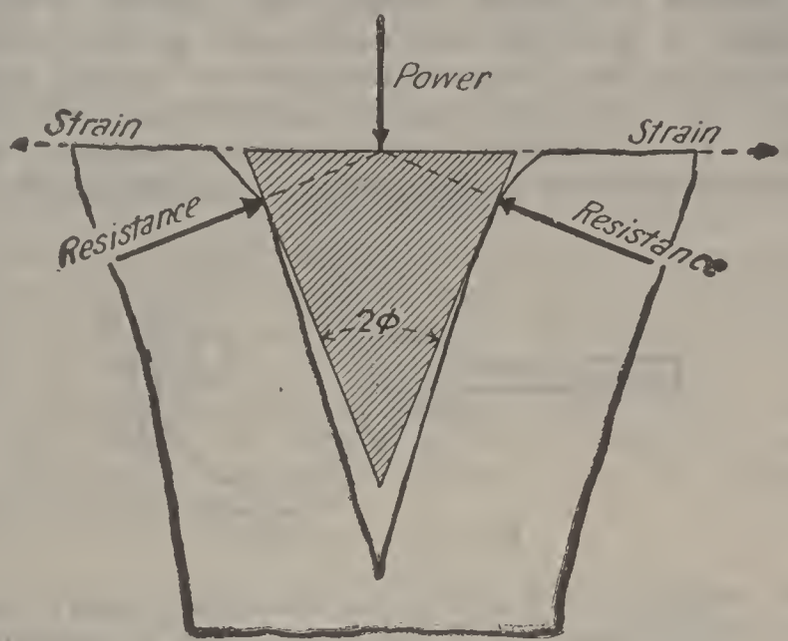


FIG. 8.— WEDGE.

used, it works in a nut of reverse form, into which its threads fit. Either the nut or the screw may be sta-

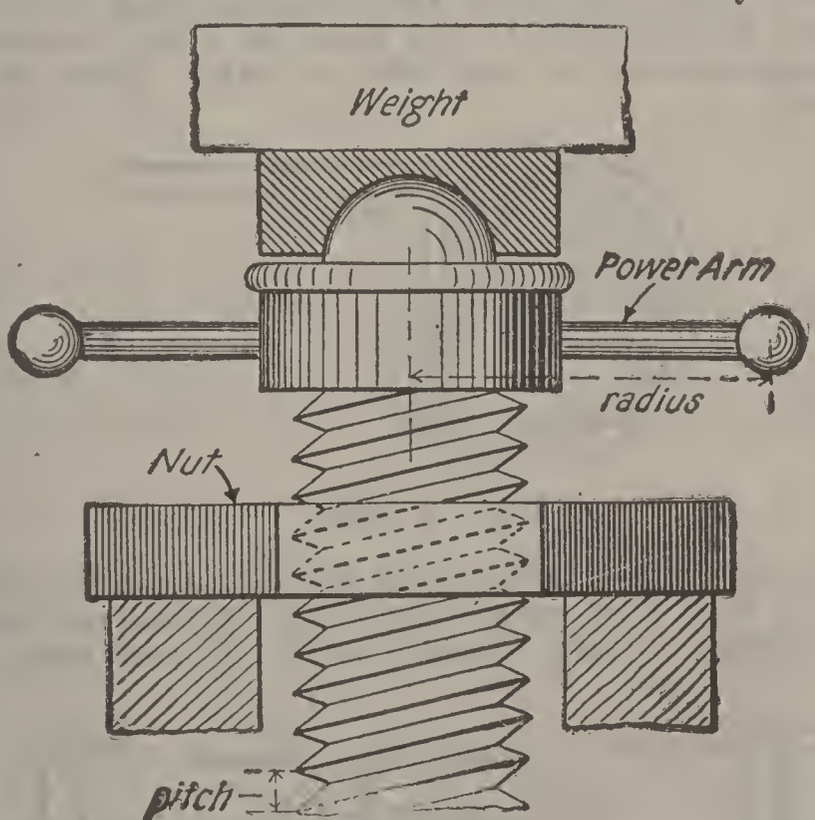


FIG. 9.

tionary. The power is applied to a lever arm at the end of the screw, with a turning motion. By this mechanism a small power may be used to move a great weight or to exert heavy pressure. Jack-screws for raising buildings, and screw presses used for various purposes, are familiar examples. (See SCREW PROPELLER AND SCREW.) Theoretically, the amount of mechanical advantage that may be gained by increasing the

length of the lever arm, or by decreasing the distance between the threads, is unlimited; but, practically, the element of friction reduces the amount of the advantage. A much greater mechanical advantage is obtained from the "differential screw," which consists essentially of one screw within another and both within a nut. The principle is advantageously applied to instruments used for making minute measurements.

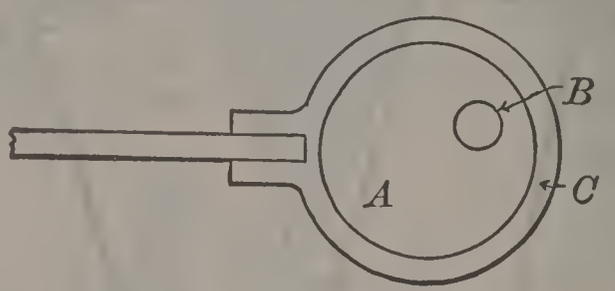


FIG. 10.— ECCENTRIC.

The eccentric is a device for changing rotary motion into reciprocating. It is commonly used to operate the valves of steam engines, and consists of a wheel (*a*) mounted fast, but out of centre, to a fixed axis or shaft (*b*), so that in rotating the wheel moves eccentrically. A ring called the eccentric strap (*c*) surrounds the eccentric, and by means of a rod the motion is communicated to the valve or other device to be moved.

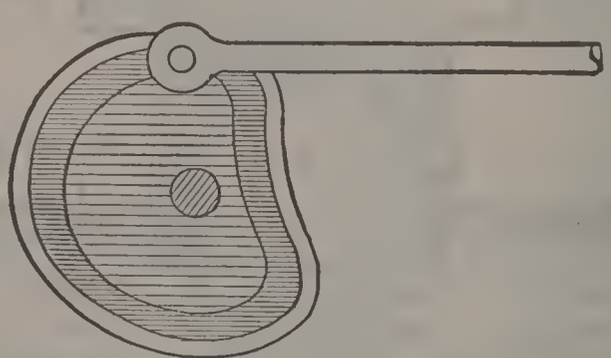


FIG. 11.— CAM.

The cam is a rotating piece, differing from the eccentric in that it is never round, but of irregular form. Its purpose is very similar, but it is used when the

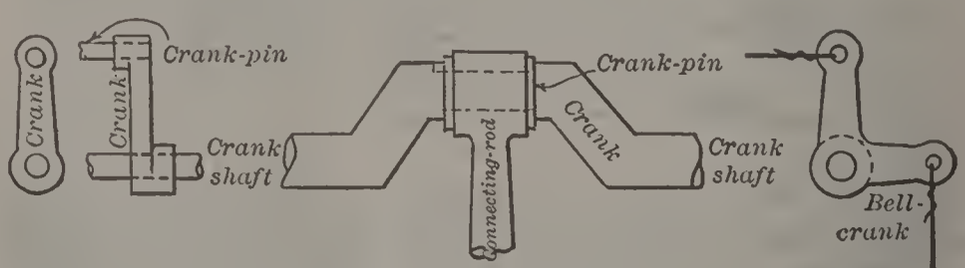


FIG. 12.— CRANKS.

motion desired is irregular. When the groove or channel of a cam is formed in the side of a wheel, it is called a

wheel-cam. The groove may also be formed in a cylinder or in an irregular-shaped piece, or there may be no groove at all, the irregular outer side of the piece serving as the guide. The groove or guide usually supports a roller, that follows its irregularities, and communicates the motion to some other part.

The crank is a device made familiar by its use on the steam engine to change the reciprocation of the piston-rod into rotary motion of the fly-wheel. It is also used reversely, to change rotary into reciprocating motion. A simple crank, as on a bicycle, is an arm, hinged to a shaft, and having at its outer end a pin called the crank-pin, which revolves about the crank-shaft. A double crank is an axle bent with a U to form the crank, the centre of the U being the crank-pin. The bell-crank is a special form for changing motion at right angles.

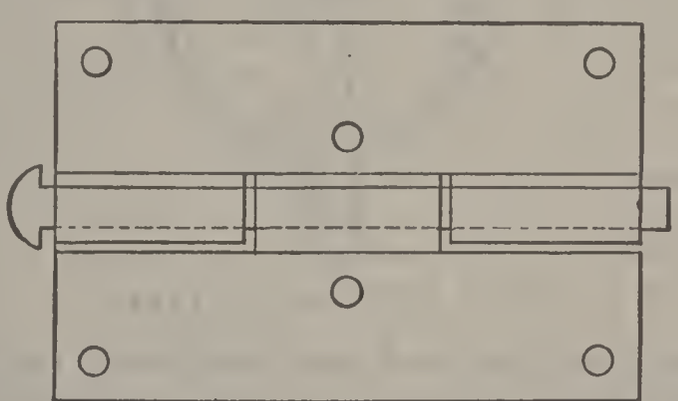


FIG. 13.— HINGE.

The hinge or joint is a means of connecting two bodies so that they will be free to move in two directions. The common door-hinge is made of two pieces of metal, having longitudinal holes. A pin passing through the holes of both leaves of the hinge completes

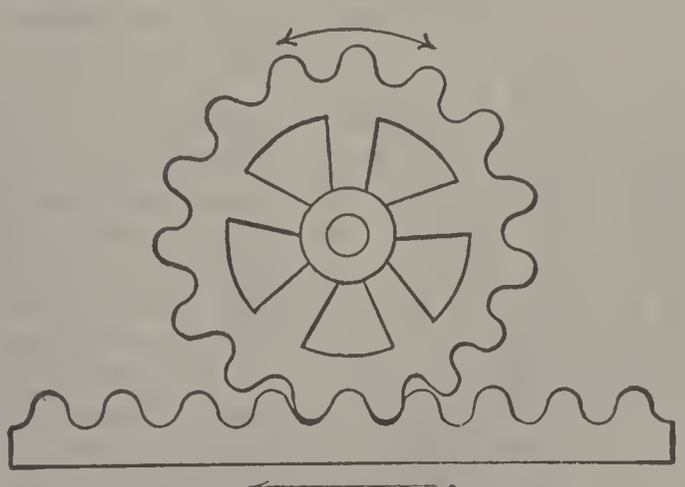


FIG. 14.— GEAR AND RACK.

the joint, and the parts swing from the centre of the pin, as an axis. The universal joint introduces an

X-piece between the parts of the hinge, and thus permits motion in all directions between 140° and 180°. It is especially useful in conveying rotary motion from the end of one shaft to the end of another that is non-parallel to the first.

The gear and rack is used to convert reciprocating motion into oscillating motion, or vice versa. The gear-wheel is a toothed wheel, and the rack has teeth shaped to intermesh with it. A common illustration of its use is on cylinder printing presses, where the rack on the type-bed, meshing with the gear on the cylinder, keeps the two moving in unison.

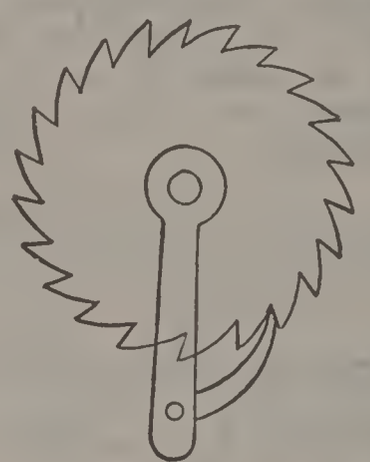


FIG. 15.— RATCHET AND PAWL.

The ratchet and pawl have many uses, the object of the pawl being to stop or start the ratchet-wheel. The principle is used in escapements and in cases where it is desired to have the ratchet move one or more teeth to each revolution of the driving part. The teeth of the wheel are specially formed to meet the pawl.

MECHANICAL POWERS: simple implements, or elementary machines, entering into the construction of every machine, however complicated. Machines are instruments interposed between the moving power and the resistance, with a view of changing the direction of the force, or otherwise modifying it. The M. P. are usually reckoned as six in number, three being primary—the *lever*, *inclined plane*, and *pulley;* three secondary, or derived from the others—the *wheel-and-axle* (derived from the lever), the *wedge*, and the *screw* (both derived from the inclined plane). To these some add toothed wheels. For what is special to each machine, see its title: a few observations applicable to all are given here. 1. In treating of the theory of the lever and other M. P., the question really examined is, not what power is necessary to move a certain weight, but what power is necessary to balance it—what force at P, for instance (see LEVER, Fig. 1), will just keep W suspended. This once done, it is obvious that the least additional force to P will suffice to begin motion. 2. In pure theoretical mechanics, it is assumed that the machines are without weight. A lever,

for instance, is supposed to be a mere rigid line; it is also supposed to be *perfectly* rigid, not bending or altering its form under any pressure. The motion of the machine is also supposed to be without friction. In practical mechanics, the weight of the machine, the yielding of its parts, and the resistance of friction have to be taken into account. 3. When the effect of a machine is to make a force overcome a resistance greater than itself, it is said to give a *mechanical advantage.* A machine, however, never actually increases power—for that would be to create work or energy, a thing now known to be as impossible as to create matter. What is gained in one way by a machine is always lost in another. One pound at the long end of a lever will lift ten pounds at the short end, if the arms are rightly proportioned; but to lift the ten pounds through one ft., the short end must descend ten ft. The two weights, when thus in motion, have equal momenta; the moving mass multiplied into its velocity is equal to the resisting mass multiplied into its velocity. When the lever seems to multiply force, it only concentrates or accumulates the exertions of the force. The descending one-pound weight, in the case above supposed, may be conceived as making ten distinct exertions of its force, each through a space of one ft.; and all these are concentrated in the raising of the ten-pound weight through one ft. The principle thus illustrated in the case of the lever holds true of all the other M. P. 4. The object of a machine is not always to increase force or pressure; it is as often to gain velocity at the expense of force: see LEVER. In a spinning-factory, e.g., the object of the train of machinery is to distribute the slowly working force of a powerful water-wheel, or other prime mover, among a multitude of terminal parts moving rapidly, but having little resistance to overcome. 5. The mechanical advantage of a compound machine is theoretically equal to the product of the separate mechanical advantages of the simple machines composing it; but in applying machines to do work, allowance must be made for the inertia of the materials composing them, the flexure of parts subjected to strains, and the friction, which increases rapidly with the complexity of the parts; and these considerations make it desirable that a machine should consist of as few parts as are consistent with the work that it has to do. 6. The forces, or 'Moving Powers,' by which machines are driven, are the muscular strength of men and animals, wind, water, electrical and magnetic attractions, steam, etc.; and the grand object in the construction of machines is, how, with a given amount of impelling power, to get the greatest amount of work of the kind required: see WORK: FOOT-POUND. This gives rise to a multitude of problems, some more or less general, others relating especially to particular cases—problems the investigation of which constitutes the science of Applied Mechanics.

MECHANICS. That branch of the science of physics which treats of the laws governing the action of forces on material things is called mechanics. The word is also used to designate the theory and practice of machinery and machine manufacture, that is, the science of machinery. As a branch of physics it may be discussed under several heads.

DYNAMICS (q.v.), in its broadest sense, treats of the properties of matter in motion, or the laws of force, whether in motion or equilibrium. It includes both statics and kinetics. STATICS (q.v.) treats of stationary bodies — that is, those in which the forces are balanced, or said to be in equilibrium. KINETICS (q.v.) treats of the effects of the forces that produce motion, and of the laws of motion.

KINEMATICS (q.v.) treats of the motions of bodies limited by space, especially with reference to change of one kind of motion for another, as rotary motion into reciprocating (back and forth) motion. The word mechanics, in ordinary use, concerns rigid bodies, as iron or wood; when it concerns liquid bodies it is HYDRO-MECHANICS (q.v.), and if it treats of gases it is PNEUMATICS (q.v.). APPLIED or PRACTICAL MECHANICS tells of the principles governing the application of the theories to practice; it is the science of the mechanical engineer and of the machinist, as well as of the architect and builder. CELESTIAL MECHANICS treats of the operation of mechanical forces in astronomy. The same laws that govern the construction of machines act to produce the motions of the heavenly bodies. ANIMAL MECHANICS is a term sometimes given to that branch of the study which treats of the mechanism of animals' joints, muscles, etc. The laws are identical with those governing machinery and the planets and stars.

I. STATICS.— Correctly speaking, all bodies are in motion, but we regard things that move exactly as the earth as being static or stationary. They are held in position by gravitation, and force is required to move them. A stationary body may represent a force, however, as a string suspending a weight. The string does not move, but if it is cut and the weight allowed to fall, that portion of the string above the cut flies upward with a recoil, showing that it has been subjected to a tension.

Two forces pulling oppositely are said to be in equilibrium. The weight hung by a string from a rafter does not produce any more force on the string than does the rafter that keeps it from falling. One force counterbalances the other, pulling in opposite directions, and producing equilibrium. If two men pull each 100 pounds on opposite ends of a rope, the rope remains stationary, in equilibrium, and is subjected to 100 pounds tension, not 200 pounds. One man simply off-

sets or balances the force of the other, just as if one end was fast to a wall.

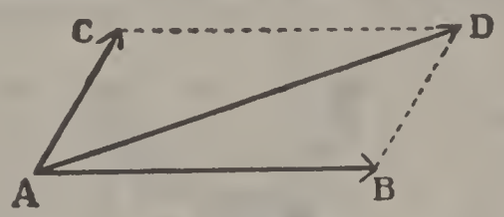


Fig. 1. Parallelogram of Forces.

If a force, as a push, be exerted at A (Fig. 1) toward D, it may be divided into two forces, each of half the original force, in the directions B and C. If the black lines were sticks, a push of a pound at A would be felt as a pound at D if there were no resistance at B and C; or, if there were no resistance at D, the push would be felt as half a pound at B and half a pound at C. Similarly, if the black lines were strings, a pull of a pound at A would produce a like pull at D, or a divided pull at C and B, if D were cut.

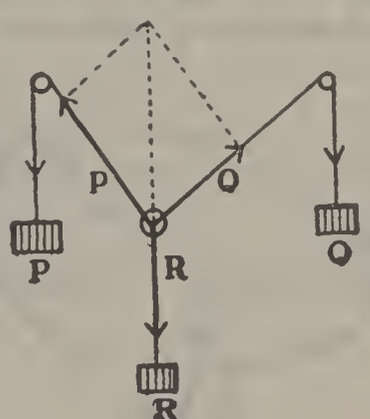


Fig. 2.

An illustration of the balancing or equilibrium of forces is shown in Fig. 2, in which the weight R, of say one pound, balances the weights P and Q, which together weigh 2 pounds. If P were a half pound and Q 1½ pounds, P would hang higher and Q lower, while R would hang closer to the heavier weight, thus securing equilibrium. If P and Q together weighed only a pound, they would rise, and R would hang lower. The more weight there is placed at R in proportion to the other weights the more the string will sag. If the reader will form such a figure with strings hung across pegs or nails in a wall, he can observe the different directions in which the forces pull, and the positions in which they are in equilibrium.

Another illustration of equilibrium may be had by hanging a weight along an inclined plane (Fig. 3).

The gravitational pull on the ball is downward toward W. If the weight be 1 pound it will pull only a

fraction of a pound on the string, because the plane partially supports it. The inclined plane is a restraint, operating opposite to the line *a*, technically called the

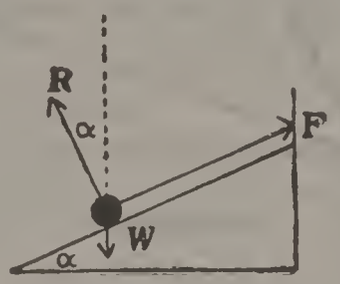


Fig. 3.

cosine. (See SINE.) The inclined plane introduces friction as one of the conditions. If the plane were very nearly level, a weight might rest on it. That angle of a plane at which a weight will begin to slide down is called the *angle of friction*.

Friction is the resistance to motion due to contact. The degree of friction depends (1) on the weight of the upper surface: (2) on the roughness of the surfaces; (3) upon tendency of adhesion.

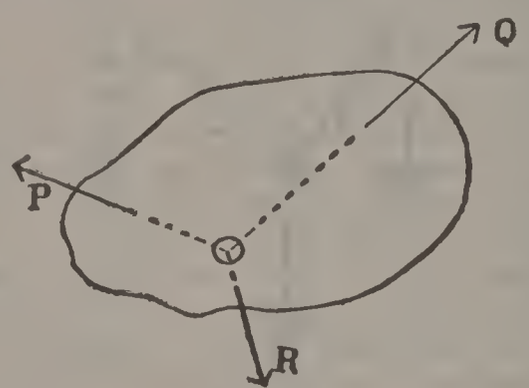


Fig. 4.

If a rigid or solid body be subjected to three forces pushing toward its centre, as in Fig. 4, each force being equal, no motion results, and the body is in equilibrium, though under stress.

When two forces affect a rigid body in opposite, yet parallel directions, so as to turn it around, this is called a couple of forces. These would tend to turn a body round forever, if not interfered with. A couple cannot be balanced or equilibrated by a single force, but it may be by another couple.

A *moment* is the measure of a force by its effect in rotation or turning, and it must be considered in making calculations concerning equilibrium under varying conditions.

II. KINETICS.— The laws of motion, as given by Newton, are: (1) *Every body persists in its state of rest or of uniform motion in a straight line, except in so far as it is compelled by impressed forces to change that state.* (The property of persistence thus defined

is called *inertia*.) (2) *Change of motion is proportional to the moving force applied, and takes place in the direction of the straight line in which the force acts.* (3) *To every action there is always an equal and contrary reaction; or, the mutual actions of any two bodies are always equal and oppositely directed.*

In considering bodies in motion we have to deal with *weight*, measured in pounds (in the metric system in *grams*); and with *acceleration* (the rate at which a body increases in motion). The fact that bodies fall with a common acceleration shews that the forces with which they are moved toward the earth or their weights are proportional to their masses. The unit of force, namely, that force which produces in a pound an acceleration corresponding to an increase of velocity of 1 foot per second in each second, has received the name of *poundal*. The unit generally used by scientists is the force which produces in a gram the acceleration corresponding to an increase of velocity of 1 centimetre per second in each second, and is called a *dyne*.

Weight and *mass* should not be confounded. Mass is the quantity of matter in a body requiring a certain force to move it, therefore mass does not change. Weight does change, being less on a smaller planet or more on a larger planet than the earth, and on the earth there is a slight difference in the weight of a mass at the top of a mountain and the same mass taken at the bottom of a valley. A simple illustration of the dynamical method of comparison of masses is

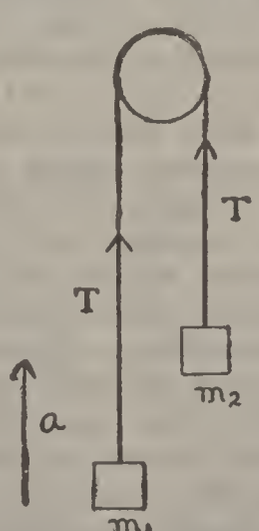


Fig. 5.

furnished by Atwood's machine, by which the laws of falling bodies may be studied. Two masses, m_1, m_2, Fig. 5, are hung from a string passing over a frictionless pulley. Since the distance moved up by one mass is equal to that moved down by the other, the velocities and accelerations of the two are equal and opposite. Each mass is acted upon by two forces, the

tension of the string upwards and its own weight downwards. The tension is the same for both.

The centre of mass of a body or of a system when moved by a force moves as if the entire body or system were concentrated at that centre. A charge of shot from a gun will scatter, but the path taken by the centre of the mass of shot will be practically the same as that of a bullet. Similarly the centre of gravity of the solar system is moving in one direction, due to external forces.

In mechanics, a *force* is that which produces a change in motion. It may consist (1) in producing motion from a state of rest; (2) in increasing or accelerating motion; (3) in decreasing or diminishing motion; (4) in stopping motion or bringing to a state of rest; (5) in changing the direction of motion.

Force is indestructible, as exhibited in the theory of the *conservation of energy*, which is that the sum total of the energy in the universe never changes, there being neither gain nor loss, though change is constant. If a weight falls and is stopped, the force is not destroyed but converted into heat, which under suitable conditions may be reconverted into force.

Experiments show that if a force acting on a mass is increased or decreased, the velocity alters in proportion. The rule evolved is that *forces are proportional to the masses moved and to the velocities generated at the same time.*

Velocity is not quite the same thing as speed. Velocity means more than the rate of motion, for it implies direction. In the case of *angular velocity*, it is the rate at which the direction changes. Velocity is *absolute* when considered with reference to the change of position of a body from one point in space to another; it is *relative* when comparing speeds on the earth or with reference to the earth.

The terms force, energy, and power are often confused. *Energy* should not be confounded with force; force is always exerted in some direction, while energy has no specific direction. Steam compressed in a boiler has energy, and it will seek an outlet in any direction. A weight placed in the boiler would have a downward force. Energy is capacity for performing work; force is that which does the work.

Kinetic energy is calculated mathematically as equal to the product of half the mass into the square of its velocity. *Potential energy* has reference to the related conditions of the parts of a body, or of bodies that act on each other, every change of the body involving a loss of energy.

Power is available energy, or a source of energy, as water-power, steam-power. A horse-power is an arbitrary measure of power, being the equivalent of 33,000 pounds avoirdupois lifted 1 foot in 1 minute. The sun's heat may be used directly to furnish power on

the earth. We use it indirectly by burning coal, which comes from vegetation thousand of years ago; also in the waterfall, operated by water raised as vapor by the sun's heat.

A body moving rapidly in a circle tends to fly outward because of *centrifugal force.* The energy is derived from whatever moves the body circularly. This may be demonstrated by tying a body to a string, whirling it rapidly and letting go. A stone hurled with a sling is an illustration. The object files off at a tangent in the effort to maintain a straight line. The earth continues in its course around the sun, and does not fall into the sun or fly off into space because the gravitational pull of the sun is always balanced by the centrifugal force pulling outward.

A force acting on a body produces *stress* — tension, torsion, pressure, etc. When nothing interferes a force moves a body, but when another force, as gravitation, opposes more or less strongly, stress results. If the stress is of a pulling nature it is *tension;* if of a twisting nature it is *tortion;* if of a crushing nature it is *pressure.*

When the force producing a stress is slight, as compared with the solidity of a body, the result is a temporary deformation, as when a rubber ball is compressed by the hand. The ball resumes its form by reason of its *elasticity.* Objects commonly regarded as rigid have some elasticity, and can be slightly deformed, returning to position without injury. An ivory billiard ball is an example. Wet such a ball, and drop it on a flat surface, and it will leave a much larger wet spot than if it is laid down gently and picked up again.

Iron and steel have elastic limits, which are calculated very closely in designing large buildings, bridges, etc. A copper wire bends readily, but if it be bent short, back and forth a number of times, it weakens and breaks, because the limit of elasticity has been passed in bending. All solids have this *limit of elasticity.* It is very small in brittle substances, like glass, yet it is there, as can be proved by making a long spiral spring of a thread of glass.

When a stress deforms a solid within the elastic limit, no harm results, and the stress may be repeated again and again. When the stress exceeds the elastic limit slightly, the damage is slight, but if repeated often enough a complete fracture will result. Metals are heated to bend and shape them, because when hot the elastic limit increases, and at a sufficient heat they may be reformed without weakening or injury.

When a body is set in motion with a result accomplished, that result is called *work.* In other words, work is the accomplishment of a result against the action of some force, as in lifting a weight or driving a vehicle over the ground. The accomplishment of

work always involves a loss of energy. Work is measured in foot-pounds, one of which is the equivalent of the force required to lift 1 pound 1 foot. All machines are designed to perform some work by their motions.

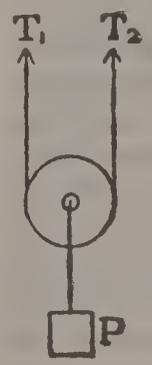


Fig. 6.

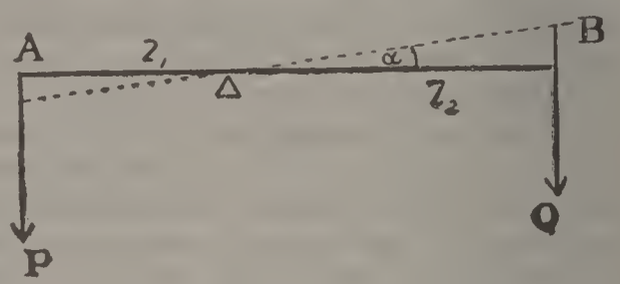


Fig. 7.

In Fig. 6, if the string on the left is pulled up 1 foot and the string on the right is fixed at T_2, the weight P is raised 6 inches, this being the work accomplished. A machine or an engine will deliver the power that is put into it (less losses by friction, etc.), no more and no less. The *effective work* that it will do depends upon the losses. Friction is a large and ever-present source of loss or waste, and machines are designed so as to produce as little friction as possible.

In Fig. 7 the lever or balance is supported at the fulcrum a little on one side of the centre. A pound pulling down at P would balance only ⅝ of a pound at Q, but A goes downward a less distance than B is raised. Equilibrium is maintained, but a weight at P is made to carry a smaller weight at Q a greater distance than P moves. The work done is greater in distance but less in quantity. One pound of force will move half a pound twice the distance that the pound travels, friction being disregarded.

It is by taking advantage of such conditions that machine makers are able to change the speed of different parts of a machine, or to secure great force for a short space of time.

III. KINEMATICS.—In kinematics we deal with changes of motion. The primary and familiar motions are: (1) In a straight line, this being the normal action of a force; (2) around an axis, that is rotary motion; (3) rolling around a circle, that is revolutionary motion, as of a planet: (4) back and forth, that is reciprocating, as a piston; (5) in a spiral, as the curve of a baseball; (6) in the arc of a circle, as the swing of a pendulum. By combining two or more of these motions, or by changing one to another, the machine designer is able to lay out machines for an almost infinite variety of purposes.

In addition to motions of direction there are sliding motions, as of the piston-rod of a steam-engine; rolling motions, as of a steel ball in the bearing of a bicycle; and wave motions, which extend into vibrations, and are

a separate study of themselves. (See light, vibration, wave, X-ray.)

A cube has 6 surfaces, and when free can be moved in any direction. Confine it at one point, as by a loose joint at a corner, and it still has freedom of motion up and down, sideways and circularly. Confine it at two points, and it may still have rotary motion. Confine it at three points and it is fixed. Substitute for the cube a piece of almost any shape and it can be pushed or pulled in the various directions, and can be rotated, and that is about all that can be done to move it mechanically. Consider this piece as a simple part of a machine, and it is apparent that there must be combination with other parts to make it useful.

To change rotary motion into reciprocating motion there has been invented the crank and connecting-rod; to change reciprocating motion to oscillating, the rack and gear-wheel; to change horizontal motion into perpendicular, the bell-crank; to change rotary motion into irregular motion, the cam. These, with others, are described under Mechanical Motions.

In considering changes of motion, the subject takes three natural divisions: (1) Applied mechanics; (2) animal mechanics; (3) celestial mechanics (for which see Astronomy).

IV. Applied Mechanics.—The application of the theories of mechanics to constructing machines, buildings, bridges, tunnels, railways, etc., is termed applied mechanics. All the physical work in the world is accomplished through the application of mechanical forces. The most simple mechanisms for utilizing these forces are termed the *mechanical powers*, namely, the lever, the inclined plane, and the cylinder or roller. The familiar contrivances based on the lever are the balance, the wheel and axle, and the pulley. The common mechanisms growing out of the inclined plane are the wedge and the screw. (See Mechanical Motions.)

A tool is a simple contrivance, and may be nothing more than a lever, as in the case of a crow-bar. When a mechanism has numerous parts and motions it is not called a tool but a machine. A machine consists of a frame, to support and hold in proper relation the moving parts, and should also have some means for attaching power to drive it, as a pulley, on which a belt may run and connect with an engine; or a pedal or crank, if it is to be operated by foot or hand power.

The moving parts of machines are composed of various combinations of the simple movements, described as mechanical motions. The wheel, gear, rack, pulley, chain or belt, lever, cam, eccentric, pawl, cylinder, roller, slide, inclined plane, screw, crank, hinge, and axle or shaft constitute almost the entire stock of basic mechanisms from which the designer must produce his machine. He may combine these indefinitely, and alter the shapes in many ways, but is restricted in shapes to those that can be easily manufactured,

Many a machine has failed because some part was difficult and expensive to make, or subject to ruinous wear. The machinist can form things by making straight cuts and circular cuts, and by drilling round holes; these are easy. But the machining of irregular shapes and forming of square holes is difficult and involves much expense. These conditions render it useless for any one to undertake to invent and design new machinery without fully understanding the principles of mechanics, the mechanisms in common use, and the forms or shapes that can be conveniently manufactured, and which will resist wear.

In architecture and building, there are no moving parts of importance to consider, and the designer deals with *loads* or weights, which his structure must carry. In designing a building he takes his ground plan for size, and designs first the top story; next the story below, figuring on material strong enough to carry the load above, and so on down to the ground. In the case of heavy buildings, he must study the nature of the soil, and provide against chance of settling. (See ARCHITECTURE and BUILDING.)

V. ANIMAL MECHANICS.—(This subject will be better understood by first reading the article on MECHANICAL MOTIONS.) Every animal is a machine in its physical structure. In the joints may be seen the common principle of the hinge, and in some joints, as the human shoulder, there is a ball-and-socket arrangement of the bones, giving almost a universal joint. In the lifting of the forearm may be observed the principle of the lever, the muscles tied to the bone contracting to furnish the power, and the fulcrum being at the elbow. The hands are capable of rotary motion, as in turning a crank, also the feet, as in propelling a bicycle. In the latter case the thigh forms the office of a crank, and the lower leg that of a connecting-rod. The heart has valves and a pump, and there are other valves in the human system. The skin is elastic, and recoils when relieved of tension. The monkey uses his tail as a rope, and the bird its tail as a rudder; the snake coils itself into a spring to get power to jump, and the bat spreads his wings to form an inclined plane to sail in the air.

The animal machine is also an engine, and requires to be supplied with fuel in the form of food for sustenance, else it will not go. An animal is limited in the effort it can put out by the amount of food it can assimilate and convert into muscular energy. Just as the engine is limited by the horse-power that its cylinders will deliver, so a man is limited in performing work by his heart action.

An animal is a much more perfect machine than any made by human hands, and every student of mechanics should study his own mechanism to better understand what he can accomplish with a machine, or to judge how a result can be achieved.

MECHANICS' LIEN, in statute law, a lien or claim upon real estate to secure payment for work or labor performed on, or materials furnished for buildings or other improvements thereon; which labor or material has been furnished at the request or with the consent, express or implied, of the owner of such real estate or other property. In the United States the increasing number of independent contractors who constructed buildings on contract, and of dealers in building material has resulted in the enactment of numerous mechanic lien laws. Such laws have also been enacted in Canada, but not in Great Britain. The statutes hold that the value of real estate is increased by the addition of improvements and that the property should accordingly be held subject to such claims. Mechanics' liens are valid prior liens over all other claims, such as mortgages, judgments or taxes, and the term covers all claims for labor, whether skilled or unskilled, and for all building materials furnished. But liens are held against the property and not personally against the owner. The lien only attaches to the very property upon which the work was done, and has no effect on other pieces of real estate of the owner. In most states the law provides that the work to which the owner is entitled under a contract must be entirely performed before the contractor can file a lien. The statutes of mechanics' liens vary in the different states in the matter of details, time of filing, method of procedure, etc., and state statutes should be consulted.

MECHANICSBURG, *mē-kăn'ĭks-bĕrg*, Pa., borough, in Cumberland co., on the Cumberland Valley railroad; about ten m. w. by s. of Harrisburg. It was settled in 1806, and in 1828 was incorporated as a borough. It is situated in an agricultural region, in which there are large deposits of iron ore. The chief manufactures are foundry and machine-shop products, spokes and wheels, wagons and carriages. Irving College (Lutheran) is located here. Pop. 4,000.

MECHANICSVILLE, *mc-kăn'ĭks-vĭl*, N. Y., village, in Saratoga co.; on the Hudson River and the Champlain Canal, and on the Delaware and H., and Boston and M. R.R.'s; about 20 m. n. of Albany. The water-power is extensive. Power is transmitted from M. to manufacturing establishments in Schenectady. The manufacturing establishments include knitting mills, sash and blind factories, paper and pulp mills, and machine shops. The village owns and operates the water-works. Pop. (1900) 4,695; (1910) 6,634.

MECHANICSVILLE, *mē-kăn'ĭks-vĭl*, Battle of: 1862, June 26; second of the so-called seven days' battles, by which McClellan, in command of the Army of the Potomac, effected his retreat from before Richmond, to Har-

rison's Landing, 1862, June 25—July 1. After the battle of Fair Oaks, 1862, May 31, a demonstration by Stonewall Jackson upon Washington, and a cavalry raid, by Gen. J. E. B. Stuart, around the right flank of the Union army, led McClellan to plan and carry out a retreat, by a flank movement, to the James river. June 25, Gen. Hooker had an action at Oak Grove, beyond Fair Oaks, in which he succeeded sufficiently to warrant pushing rapidly for Richmond. But McClellan recalled him, to carry out his plan of retreat. June 26, the Confederate force under Gen. D. H. Hill made a vigorous, but very ill-concerted attack on Fitz-John Porter, at Mechanicsville. Porter had no difficulty in repelling the enemy at every point, inflicting on them enormous loss—upon Gen. Longstreet's admission, between 3,000 and 4,000—while his own was less than 400. See CHICKAHOMINY, BATTLES OF THE.

MECHANOGRAPHY, n. *mĕk′ăn-ŏg′ră-fĭ* [Gr. *mechănē*, a machine; *grapho*, I write]: the art of multiplying copies of any writing or work of art by the use of a machine. MECH′ANOG′RAPHIST, n. *-ŏg′ră-fĭst*, one who is skilled in mechanography.

MÈCHE, n. *māsh* [F.]: a bunch or pledget of charpie, cotton, or raw silk, for keeping open an ulcer or wound; applied by an instrument known as a portemèche.

MECHITARISTS, *mĕk-ĭt′âr-ĭsts:* congregation of Armenian monks who reside on the island of San Lazaro at Venice, but who have obtained a footing also in France, Austria, Turkey, Russia, etc. They derive their name from an Armenian, MECHITAR (i.e., the Comforter) DA PETRO (1676–1749), who, 1701, founded at Constantinople a religious society for the intellectual, moral, and spiritual improvement of his countrymen, and for diffusing a knowledge of the old Armenian language and literature. Subsequently, the M. removed to the Morea, and thence, on the conquest of that portion of Greece by the Turks 1715, to San Lazaro, which was granted to them by the Venetian government.—The order of M. acknowledge the supremacy of the Roman pontiff, and received formal papal recognition 1712. Their rule is like the Benedictine; in their service they use the Armenian language and the Syrian rite. Their most useful occupation is preparing and printing critical editions of the classic writings of Armenian literature, and of the Armenian version of the Bible; also old translations of works whose originals are lost—e.g., some works of Ephraem Syrus, Philo, and Eusebius: their editions are universally admitted to be the best and most correct. At San Lazaro they have a large library, rich in Armenian MSS.; and their station at Vienna (since 1810) has taken on the character of a learned "academy," with distinguished honorary members not of the Rom. Cath. Church. They also issue a *journal*, much read throughout the Levant.—Compare Boné, *Le Convent de St.-Lazare à Venise, ou Histoire succincte de l'Ordre des Méchitaristes Arméniens* (Paris 1837).

MECHLIN, n. *mĕk'lĭn*: a beautiful light Belgium lace made at *Mechlin*.

MECHLIN, *mĕk'lĭn:* or MALINES, *mȧ-lēn':* one of the chief cities of the Belgian province of Antwerp, 15 m. s.s.e. of the city of Antwerp, on the navigable river Dyle. It has fine squares, noble buildings, and wide, regular streets, but is devoid of signs of animation and industry, having lost its former greatness, and fallen far behind all other Belgian cities in commercial enterprise and industrial activity. As the see of the cardinal-primate of Belgium, it still retains a degree of ecclesiastical importance, and possesses numerous churches, the most noteworthy of which is the cathedral of St. Romuald, a vast building, covering nearly two acres of ground, and adorned in the interior with many fine pictures and choice carvings. It was built between the 12th and 15th c., but one tower, 345 ft. in height, remains unfinished. The other objects most noticeable are the churches of St. John and of Our Lady, which contain works by Rubens; the town-hall, dating from the 15th c., and known as the Beyard; the Market Hall, an ancient building, with towers, erected 1340, and now used as a guard-house; the splendid modern archiepiscopal palace; and the monument to Margaret of Austria, erected 1849. M. has two clerical seminaries, an academy of painting, a gymnasium, and a botanical garden. It still retains some of the important lace manufactories for which it has been long noted, and manufactures caps and woolen goods, besides having considerable breweries. M. constitutes an important central point of junction for the entire Belgian system of railways. Pop. (1881) 43,354; (1901) 56,509.

MECHOACAN, n. *mĕ-kō'ă-kăn:* the root of a species of convolvulus producing a kind of white jalap—from *Mechoacan* in Mexico; the root of *Ipomœa jal'ăpă.*

MECKLENBURG, *mĕk'lĕn-bĕrg*, DECLARATION OF INDEPENDENCE: series of five resolutions adopted by a public meeting at Charlotte, cap. of Mecklenburg co., N. C., 1775, May 20 (some authorities say May 31), in view of a vote, Feb. 9, of the Brit. parliament, denouncing action in Mass. as rebellion. The resolutions denounced the action of parliament, declared the tie to Great Britain severed, protested the colonial right to independence, enjoined obedience to the laws as of colonial authority, and invested the delegates and militia officers with authority to keep the peace. By a sixth resolution it was ordered that the declaration be sent by express to congress at Philadelphia; and, for immediate purposes of peace and safety, a second series of 20 resolutions were adopted. The first series are credited to the pen of Dr. Ephraim Brevard, and the second were the result of action taken by Col. Thomas Polk, commander of the co. militia. This was doubtless the earliest declaration of Amer. independence; but it was only local, representing only the citizens of a single county. Its tenor was quite similar to that of the later national Declaration.

MECKLENBURG-SCHWERIN, *měk'lĕn-bûrĉh-shwa-rēn':* grand duchy in n. Germany; bounded n. by the Baltic, e. by Pomerania, s. by Brandenburg, w. by Lauenburg; about 5,136 sq.m. Pop. (1900) 607,770. Mecklenburg-Schwerin is watered by several rivers, most important of which are the Elbe and the Warnow; and has a great many lakes and ponds, yielding abundant supply of fish. The country is generally flat, though here and there intersected by low ranges of hills, and its surface is still extensively covered with wood, notwithstanding the great clearings which have been made in the forests within a century. Near the sea are large tracts of sand and morass; but, on the whole, the soil is good, and well adapted for the growth of corn or the rearing of cattle, which are the principal native industries. There is considerable commerce through Warnemünde (Rostock) and Wismar. The grand duchy is divided into the circles of Schwerin, Güstrow, Rostock, and Wismar; cap. Schwerin. The central and s.e. districts are the most densely peopled. The people of both the Mecklenburg duchies (Schwerin and Strelitz) are mostly of Slavonic origin, but amalgamation with their Saxon neighbors has largely Germanized the original race. The predominating form of religion is the Lutheran; Rom. Cath. and other churches numbering about 1,100 members, while there are more than 3,000 Jews. Much has been done of late in extending the educational organization of both duchies, though the lower classes do not yet have as many advantages as in most other districts of Germany. Besides the university at Rostock (q.v.), there are five gymnasia, and numerous burgher, parochial, and other schools. The troops of Mecklenburg-Schwerin number in time of peace 2,700 men, and on a war-footing 5,380. The principal towns are the cap. Schwerin, Ludwigslust, Rostock, Güstrow, and Wismar. The grand duke, whose powers are limited by a mixed feudal and constitutional form of government, has the title Royal Highness, and is styled Prince of the Wends and of Schwerin and Ratzeburg, Count of Schwerin, and Lord of Rostock, Stargard, etc. The two Mecklenburg duchies have provincial estates in common, which meet once a year, alternately at Malchin and Sternberg. This united chamber consists of 684 landowners and the representatives of 47 provincial boroughs; while the country people have no representation. There is no general budget for Mecklenburg-Schwerin; there are three entirely distinct systems of finance. The budget of the first system, called the administration of the sovereign, is estimated at about 12,000,000 marks; the second, the states administration, has but small resources to dispose of; the ordinary budget of the common administration of the sovereign and the states is somewhat more than 2,000,000 marks. The public debt is about 113,240,000 marks. Mecklenburg-Schwerin has two votes in the federal council, and six representatives in the imperial diet.

History.—The Mecklenburg territory, anciently occu-

pied by Germanic, afterward by Slavonic, tribes, was finally subdued, in the 12th c., by Henry the Lion, Duke of Saxony, who, after thoroughly devastating the country, and compelling the small number of inhabitants remaining after the war to adopt Christianity, restored the greater part of the territory to Burewin, the heir of the slain Slavonic prince, Niklot, and gave him his daughter in marriage. The country at that period received its present designation from its principal settlement, Mikilinburg, now a village between Wismar and Bruël. In 1349 it was elevated into a duchy by Emperor Charles. Duke Johann Albrecht introduced the Prot. doctrines 1550, and his grandsons, Wolf-Friedrich and Johann Albrecht, founded the lines of Mecklenburg-Schwerin and Mecklenburg-Güstrow, which were, however, deprived of the ducal title 1627, in consequence of their adhesion to the Prot. cause, when the imperial gen. Wallenstein was proclaimed duke of all Mecklenburg. In 1632 Gustavus Adolphus of Sweden restored his kinsmen, the deposed dukes, to their domains. After various subdivisions of the ducal line into the branches of Schwerin, Strelitz, and others, and the successive extinction of several of these collateral houses, the Imperial Commission, at Hamburg, 1701, brought about a family compact, by which it was arranged that Schwerin and Güstrow should form one duchy, and Strelitz, with Ratzeburg and Stargard, Mirow and Nemerow, another independent sovereignty. After this, few events of importance occurred till the accession in Schwerin, 1785, of Friedrich Franz, who obtained the title grand duke 1815, and died 1837, after a long reign, which he had made highly conducive to the internal welfare and external reputation of his hereditary dominions. The reign of Friedrich Franz II., who succeeded his father Paul Friedrich, 1842, was disturbed by a contest between the nobles and the burgher and equestrian landowners, the former arrogating to themselves the exclusive right of electing members into the equestrian order, nominating to benefices, and monopolizing other prerogatives of the ancient feudal nobility. The revolutionary excitement of 1848 gave a fresh stimulus to the popular ferment, and the disturbances could be quelled only by the intervention of Prussian troops. Both as members of the N. German Confederation and of the empire, the two duchies have maintained their internal constitution much on the old footing.

MECK'LENBURG-STRELITZ, *-strā'lĭts:* grand duchy in n. Germany, composed of two distinct portions of territory—viz., Stargard (much the larger division, e. of Mecklenburg-Schwerin) and the principality of Ratzeburg (between Mecklenburg-Schwerin and Lauenburg); more than 1,000 sq. m. Pop. (1900) 102,602. The country is flat, and similar in physical characters, to Schwerin, though its greater distance from the sea gives it a climate less humid and less changeable. Strelitz, as already observed, has one joint representative chamber

with Schwerin, but the lordship of Ratzeburg is not included in these estates, and is governed directly by the grand duke, who possesses considerable private domains, from which he draws large revenues. The grand duke gave Ratzeburg a representative constitution 1869. Mecklenburg-Strelitz has one vote in the federal council of the empire, and one representative in the diet. Its debt is about six million marks. For the history of Mecklenburg-Strelitz, see MECKLENBURG-SCHWERIN.

The Mecklenburg duchies are essentially agricultural, 71 per cent. of the inhabitants being employed on the land. In Mecklenburg-Schwerin 3,549 sq.m., and in Mecklenburg-Strelitz 670 sq.m. are under cultivation. The cattle of the duchies are considered the best in Germany; the horses especially are in high esteem. The principal products are corn (exported to Scandinavian and British ports), cattle and sheep (sent to the markets of Hamburg and Berlin), wool, tobacco, butter, cheese, fish, fruit, hides, etc. The matricular contribution of both duchies toward imperial expenditure amounts to about 1,000,000 marks.

MECOMETER, n. *mĕ-kŏm'ĕ-tĕr* [Gr. *mēkos*, length; *metron*, a measure]: a graduated instrument for measuring the length of new-born infants.

MECONIC, a. *mĕ-kŏn'ĭk* [Gr. *mēkōn*, a poppy]: belonging to the poppy. MECONIC ACID ($C_7H_4O_7$), peculiar acid existing in opium, which, when good, yields from 6 to 8 per cent. of it. Both the acid and its salts assume a characteristic blood-red tint with persalts of iron, and this test, which is very sensitive, is employed by the toxicologist in searching for traces of opium. As, however, the alkaline sulphocyanides which exist normally in the saliva give a precisely similar tint with the persalts of iron, it is necessary to be able to distinguish the meconate of iron from the sulphocyanide of iron. A solution of terchloride of gold or of corrosive sublimate removes all doubt, by discharging the color of the sulphocyanide, but not affecting the color of the meconate of iron. MECONATE, n. *mĕk'ŏ-nāt*, a salt consisting of meconic acid and a base. MEC'ONINE, n. *-ŏ-nĭn*, a white substance contained in opium. MECONIUM, n. *mĕ-kō'nĭ-ŭm* [L. *mĕcōnĭŭm*]: thickened juice of the poppy, called opium. The term is applied also to the earliest matter discharged from the bowels of a new-born infant. It is of brownish-green or almost black color, acid to test-paper, but devoid of odor, and rapidly putrefying on exposure to air. It is usually regarded as a product of the fetal liver, but, according to Lehmann, it contains neither biliary acids nor bile-pigment. When examined under the microscope, it is found to consist of an abundance of cylinder epithelium of beautiful green tint, of mucus-corpuscles, and of fat, with which there is much cholesterine.

MEDAL, n. *mĕd'ăl* [F. *médaille*—from It. *medaglia;*

mid. L. *medălĭă* and *medalla*, any ancient coin, but originally simply a coin in value between one of a lower and a higher denomination—from L. *mĕdĭŭs*, middle: comp. Icel. *midla*, to divide]: piece of metal in the form of a coin, not issued or circulated as money, but stamped with a figure or device to preserve the portrait of some eminent person, or the memory of some illustrious action or event—usually bestowed as a high honorary reward for merit. The name is applied sometimes to an ancient coin. MED'ALLET, n. *-lĕt*, a small medal. MED'ALLIST, n. *-lĭst*, one who has gained a medal as a reward of merit; one versed in ancient coins or medals; a designer or engraver of medals. MEDALLIC, a. *mĕ-dăl'lĭk*, pertaining to medals. MEDALLION, n. *mĕ-dăl'yŭn* [F. *médaillon*]: a large antique medal; the representation in a cast of a medallion; any circular or oval tablet (as in architecture) bearing a head, bust, figure, etc. *Note.*—It is also said that F. *médaille*, mid. L. *medălĭă*, etc., are from mid. L. *metallĕă*—from L. *metallum*, a metal—see Skeat and Brachet: the text agrees with Wedgwood.—*Medals* offer a study interesting in a historical and antiquarian view, and important as illustrating successive states of art. Like coins, medals belong to two periods, ancient and modern, separated by a wide interval. To the former belong those pieces issuing from the mint of ancient Rome, known as *medallions*, of the size of the aureus in gold, of the denarius in silver, and of the first or large brass in copper. They are generally supposed to have been struck on occasions similar to those on which medals are coined in modern times, on the accession of an emperor, on the achievement of an important victory, or as specimens of workmanship; but there are circumstances which countenance the belief that they were circulated as money. Medallions prior to the time of Hadrian are rare and of great value, one of the most beautiful and most famous being a gold medallion of Augustus Cæsar: from Hadrian to the close of the Empire they are comparatively common. Of the Roman medallions, some were struck by order of the emperors, some by the senate; the latter may be known by being inscribed with the letters S. C. The larger bronze medallions are of admirable workmanship. In some of them, a ring of bronze surrounds a centre of copper, and the inscription extends over both medals. No portrait of a person not princely occurs on any ancient medal—a remarkable fact, considering the numerous contemporary statues of poets, historians, and philosophers. The *Contorniati* are bronze medals marked with furrows (*contorni*), distributed at the public games, and apparently also in use as money. Numerous medals and medallions were struck in the Greek provinces of the Roman empire, usually of less substance and thickness than those of Rome. The Sicilian medals are of fine workmanship, particularly one with a head of Ceres, and on the reverse a Victory crowning a figure in a car.

MEDAL.

Modern medals began in the 14th c., but few were struck prior to the 15th. Portraits of non-princely persons are freely introduced after the 16th c. An affectation of the classical detracts from their value as illustrations of contemporary life. Most European countries possess a succession of medals from the 15th c. onward. The best in design of the 15th c. medals are those wrought by Victor Pisani, of Verona, inscribed 'Opus Pisani Pictoris.' The medals of the popes form an unbroken series from the time of Paul II., pontiff 1464-71. Those that purport to be of earlier popes are known to be of later date. The reverse generally bears the cross-keys and mitre, and the obverse the head of the reigning pope. Some of the medals of Julius II., Leo X., and Clement VII. have an especial value, as having been designed by Raphael and Giulio Romano, and engraved by Benvenuto Cellini. A 16th c. medal of Sicily is probably the first instance in modern times of the use of a medal as a vehicle of political satire; it is directed by Frederick II. against his adversary, Ferdinand of Spain, whose head is on the obverse, with the inscription, 'Ferdinandus R. R. Vetus Vulpes Orbis;' and on the reverse a wolf carrying off a sheep, with 'Jugum meum suave est et opus meum leve.' Satirical medals were afterward common in the Low Countries. A medal representing Van Heubingen, the Dutch ambassador, in the character of Joshua arresting the course of the sun, is said to have so exasperated Louis XIV., who was understood to be typified by that luminary, as to cause the whole hostile force of France to be brought against Holland. Some of the Dutch medals are noted for the elaborate views, maps, and plans engraved on them. France produced few medals prior to the time of Louis XIV.; but there is a series illustrative of the chief events in the life of the Grand Monarque, and another devoted to the career of the First Napoleon. The Spanish medals begin with Gonsalvo about 1500. Scotland produced one of the earliest of modern medals, struck by David II., perhaps during his captivity in England, and formed on the model of the nobles of Edward III. English medals begin with Henry VIII., and from Edward VI. onward there is an unbroken succession of coronation medals. The Scottish gold coronation medal of Charles I. is the first medal struck in Britain with a legend on the edge. The medals of the Commonwealth and Charles II. are by Simon; those of Queen Anne record the achievements of Marlborough. Medals, in connection with NUMISMATICS (q.v.), are treated of by the various writers on that subject.

Medals in the present day are conferred by the sovereign or by a government, as marks of distinction for eminent worth or noble conduct, particularly for naval and military services. Such medals of honor are seldom of great intrinsic value, their worth depending on the associations connected with them. Military medals have ribbons attached, with clasps or small bars, each of which bears the name of a particular action. The Water-

loo medal is of silver, with the head of George IV. (prince regent), a winged Victory, and the words 'Waterloo,' 'Wellington;' it hangs from a crimson ribbon, with a narrow stripe of blue near each edge. The Crimean medal also is of silver. Good-service medals of silver were instituted 1830 and 31, and rules formed for their distribution among meritorious sailors, soldiers, and marines. The naval medal is worn suspended from a blue, and the military from a crimson, ribbon. Medals and decorations do not seem to have been ever conferred as rewards in the army or navy prior to the Commonwealth. The French military medal and the Sardinian war-medal were some time ago bestowed to a large extent on British officers, soldiers, seamen, and marines. The former exhibits the effigy of Napoleon III., surmounted by an eagle, and is worn from a yellow ribbon with green borders; the latter is charged with the cross of Savoy, and suspended from a sky-blue ribbon. No medal of honor from any foreign sovereign is allowed to be worn or accepted by any British subject without the sanction of the queen.

In the United States there is no restriction on making and issuing medals, which, besides being conferred by the govt. in honor of noble conduct, may be issued also by associations and by private persons.

MEDALLURGY, n. *mĕd'ăl-ėr-jĭ* [Eng. *medal*, and Gr. *ergon*, a work]: the act of making and striking medals and coins.

MEDDLE, v. *mĕd'l* [OF. *mesler* and *medler*, to meddle, to mingle: comp. It. *mischiare;* prov. Sp. *mesclar*, to mix]: to interpose and act in the concerns of others officiously; to touch or handle; to interfere; to intermeddle. MED'DLING, imp. *-lĭng:* ADJ. interposing officiously and impertinently. MEDDLED, pp. *mĕd'ld.* MEDDLER, n. *mĕd'lėr*, one who interferes officiously. MEDDLESOME, a. *mĕd'l-sŭm*, given to meddling; officious. MED'DLINGLY, ad. *-lĭ.*

MEDEA, *mē-dē'a:* in Grecian legend, a famous sorceress, daughter of Aëtes, King of Colchis, and of the Oceanid Idyia or of Hecate. She married Jason, leader of the Argonauts (q.v.), and aided him in obtaining the Golden Fleece. Jason, after his return home, being desirous to be revenged on Pelias for the murder of his parents and his brother, M. persuaded the daughter of Pelias to cut him in pieces and boil him, in order to make him young again. Jason and she fled to Corinth, where, after she had been his wife for ten years, he repudiated her, to marry Glauce or Creusa; and M., in revenge, sent by her son to her rival a poisoned robe or diadem, the virulence of which destroyed both her and her father. M. then slew the children which she had borne to Jason, and fled to Athens in a chariot drawn by dragons, which she obtained from Helios. There she was received by Ægeus, to whom she bore Medos; but afterward being compelled to flee from Ægeus, she took Medos to Aria.

the inhabitants of which were thenceforth called Medes. She finally became immortal, and the spouse of Achilles in the Elysian Fields. This absurd and repulsive classic legend, doubtless originally one of the cycle of sun-myths, afforded material for many productions of the tragic muse, and subjects for the painter and sculptor, and even in modern times has been so employed.

MEDEAH, *mā-dā'â:* town of Algeria, 43 m. s.s.w. of the town of Algiers. It comprises a walled town and suburbs, and is considered as one of the finest towns in Algeria. There is an Arab market every Friday. Under the Romans, Medeah was a military station. Pop. of city 5,000; total pop. of city, suburbs, and commune, 15,500.

MEDELLIN, *mā-dĕl-yēn'* or *mā-thĕl-yēn':* city of the United States of Colombia, S. America, cap. of the state of Antioquia; 50 m. s.e. of the city of Antioquia, between the ranges of the central and western Cordilleras. It is a beautiful town, 4,845 ft. above sea-level, and its climate is exceedingly pleasant. Pop. about 40,000.

MEDE'OLA. See INDIAN CUCUMBER.

MEDFORD: Mass., city in Middlesex county, on the Mystic river, and on the Boston & Maine railroad; 5 miles north-northwest of Boston. Its area is about 10 square miles.

Industries.—The industries of the city are few, it being mainly a residential suburb of Boston, but there are some manufactures, such as machinery, cotton goods, rum, dyes, chemicals, and brick. The city was formerly a great shipbuilding centre. Here, in 1631, July 4, the first ship built in the colony was launched and started the famous industry of Medford, which prospered until 1873, when the last ship was built.

Public, Educational and Charitable Institutions, Etc.—Among the public institutions may be mentioned the Armory building and the public library, containing 29,000 volumes. Medford is the seat of Tufts College (q.v.), whose group of 17 buildings add greatly to the attractiveness of the city. For public education there are one high school, four graded grammar schools, several smaller schools and seven kindergartens. Of the charitable institutions the most prominent is the Medford Home for Aged Men and Women. Religious services are held in 17 church edifices. There are two banks—one savings and one national. There is only one newspaper published in the city.

Public Works.—Situated as it is on rising ground on both sides of the Mystic river, the city affords many picturesque views. There are good roads, a greater portion of which are macadamized; surrounding the city are boulevards connecting with the metropolitan system around Boston; there are excellent electric-trolley, electric light, water, and sewerage systems. To the north of the city is the great Middlesex Falls, and throughout the

city are many parks and playgrounds. There are three cemeteries, in the largest of which, Oak Grove, containing 34 acres, stands the Soldiers' Monument, dedicated in 1866 and erected at a cost of $3,350. There are many buildings of historic interest, of which Cradock House was built in 1634 and is probably one of the oldest buildings in the United States retaining its original form.

History, Government, and Population.—Medford is one of the oldest settlements in the country, having been formally established in 1630, when Mathew Cradock, the first governor of Massachusetts Bay Colony, sent a party of men to establish fisheries along the Mystic. They established a small hamlet and first called it Meadford. Prior to its incorporation as a city in 1892 its affairs were administered by town meetings, but in 1892, upon receiving its charter as a city, which brought within its limits South and West Medford, Hillside, Glenwood, and Wellington, the government was vested in a mayor, holding office for two years, and a city council of two branches composed of 24 members. The charter was amended by act of the general court of 1903, and now the city government consists of a mayor and a board of aldermen of 21 members. The officials of the fire department and police department, and other administrative officials, are appointed by the mayor or elected by the council. The board of education is elected by popular vote. Pop. (1900) 18,244; (1910) 23,150. Consult: Usher, *History of the Town of Medford, Mass.;* Winthrop, *History of New England;* Frothingham, *History of Charlestown;* Historical Register of the Medford Historical Society; Town Records of Medford; Colonial Records of the Mass. Hist. Soc. Collections; and *Medford, Past and Present*, published by the Medford *Mercury* (1905).

MEDHURST, *mĕd'hėrst*, Walter Henry, D.D.: 1796-1857, Jan. 24; b. London; missionary to the Chinese. A pupil of St. Paul's School, London, and trained as a printer, he was sent by the London Missionary Soc. to Malacca 1816; showed great linguistic powers; was ordained at Malacca 1819, and entered on an unexampled course of scholarly labors, first at Penang, then at Batavia (Java), 1822-30. He removed to Canton, China, 1830, and thence to Shanghai 1843, and prosecuted there very successful mission work until 1856. A visit to England, 1856, ended with his death, two days after reaching London. Medhurst early mastered the Malay, Chinese, and Japanese languages. His exact learning contributed to a revision of the versions already made of the Bible into Chinese, and secured an almost perfect translation. Wholly consecrated to mission work, of extraordinary gifts, generous, genial, versatile, and strong, Medhurst rendered services rarely paralleled. His numerous writings include *Chinese Repository* (20 vols. Canton 1838-51); *Chinese-English Dictionary* (2 vols. Batavia 1842-3);

Account of the Malayan Archipelago; China, its State and Prospects (1838); *A Glance at the Interior of China* (1850); *Chinese Miscellanies* (3 vols. Shanghai 1849-53), and translations of the Chinese classic *Shu-King,* and of many other Chinese and oriental writings.

MEDIA. See MEDIUM.

MEDIA, *mē'dĭ-a:* in ancient times, the n.w. part of Iran, bounded by the Caspian Sea on the n., by Persia on the s., by Parthia on the e., and by Assyria on the w. The n. portion of the country is very mountainous; the south is rich and fertile. Media at present forms the Persian provinces of Azerbijan, Ghilan, Mazanderan, and Irak-Ajemi, and the n. portion of Luristan. The Medians were in language, religion, and manners very nearly allied to the Persians. After they had shaken off the yoke of the Assyrians, their tribes united about B.C. 708, according to the common account, chose Dejoces (Kai-Kobad) for their chief, and made Ecbatana their capital. His son Phraortes, or Arphaxad, subdued the Persians. Cyaxares (Kai-Kaous), son of Phraortes, in alliance with Nabopolassar, King of Babylon, overthrew the Assyrian empire about B.C. 604, spread the terror of his arms to Egypt and the furthest bounds of Asia Minor, and vanquished the brigand hordes of Scythia, who had carried their ravages as far as Syria. He was succeeded by his son Astyage (Asdehak), who was deposed (B.C. 560) by his own grandson Cyrus (Kai-Khûsru), King of Persia; and from this time the two nations are spoken of as one people. Ecbatana, cap. of Media, became the summer residence of the Persian kings. After the death of Alexander the Great (B.C. 324), the n.w. portion (*Atropatene*) of Media became a separate kingdom, and existed till the time of Augustus; the other portion, under the name of *Great Madia,* forming a part of the Syrian monarchy. Media was on several occasions separated from Persia. B.C. 152, Mithridates I. took Great Media from the Syrians, and annexed it to the Parthian empire, and about B.C. 36 it had a king of its own, Artavasdes, against whom Mark Antony made war. Under the Sassanian dynasty, the whole of Media was united to Persia. It became, during the 14th and 15th centuries, the stronghold of the Turkoman tribes Kara-Koinlû, or 'Black-Sheep,' and Ak-Koinlû, or 'White Sheep.'

In early times, the Medes were a warlike race, with enthusiastic love of independence, and distinguished for their skill with the bow. They were famed for their horsemanship, and it was from them that the Persians adopted this and other favorite exercises and acquirements. In subsequent times, they appear to have become effeminated by luxury. (See the works of Xenophon, Strabo, and Ammianus.

MEDIÆ, n. plu. *mē'dĭ-ē* [L. *medĭus,* middle]: medial or middle parts.

MEDIÆVAL, or MEDIEVAL, a. *mĕd'ĭ-ē'văl* [L. *mĕdĭŭs,* middle: *ævum,* an age]: of or relating to the middle ages —a period extending from the sixth to the fifteenth century of the Christian era. MED'IÆ'VALISM, n. *-văl-ĭzm,* the spirit or practices of the middle ages; conformity to the style and manner prevalent during the centuries before the Reformation.

MEDIAL, a. *mē'dĭ-ăl* [F. *médial,* medial—from L. *mĕdĭŭs,* middle], middle; denoting a mean proportion. MEDIAN, a. *mē'dĭ-ăn,* relating to or in connection with the middle of anything. MEDIANT, n. *mē'dĭ-ănt,* in *music,* the third above the key-note. MEDIAL PLANE or LINE, an ideal line or plane dividing a body longitudinally into two equal parts. *Note.*—MEDIAL LINE is strictly one of the two edges or boundaries of the *medial plane.*

MEDIASTINE, n. *mē'dĭ-ăs'tĭn,* or ME'DIASTI'NUM, n. *-tĭ'nŭm* [F. *médiastin,* mediastine—from L. *medĭastīnus,* one standing in the middle, a servant—from *medĭŭs,* middle]: a membraneous partition which divides any organ or cavity into two halves, especially that dividing the cavity of the chest into two parts, separating the two lungs from each other; a continuation of the pleura. As the pleuræ are not in opposition there is a space between them, which is also called the mediastinum. In man the mediastinum contains the heart and great vessels. ME'DIASTI'NAL, a. *-tī'năl,* of or connected with the mediastinum.

MEDIATE, a. *mē'dĭ-āt* [F. *médiat,* mediate—from mid. L. *medĭātus,* divided in the middle, middle—from L. *medĭŭs,* middle]: middle; being between the two extremes; intervening; acting by means: also, with cognate signification to *mediatized* (q.v.): V. to interpose between parties at variance as the equal friend of both; to intercede. ME'DIATING, imp. ME'DIATED, pp. ME'DIATELY, ad. *-lĭ,* by a secondary cause; in such a manner that something acts between the first cause and the last effect. ME'DIATENESS, n. *-nĕs,* the state or quality of being mediate. MEDIATION, n. *mē'dĭ-ā'shŭn* [F.—L.]: the act of mediating or interposing; the acting between parties at variance with a view to reconcile them. MEDIATIZE, v. *mē'dĭ-ă-tīz,* to change from an immediate or direct relationship to an indirect one; to annex, as a smaller state to a larger contiguous one.—*Mediate* was the term descriptive of certain states of the old German empire, being lordships or possessions which were held by feudal tenure under one of the greater vassals, and so only *mediately* under the emperor as the supreme feudal lord. ME'DIATIZING, imp. ME'DIATIZED, pp. *-tīzd:* ADJ. placed in a mediate relation to the emperor—said of the smaller states of the German empire, many of which were gradually reduced to this condition as the neighboring greater states increased in power; and amid the changes caused by the wars of the French revolution 1803-06, many small lordships were thus *mediatized*

in which the greater states found a sort of compensation for their losses in other quarters. The term continued to be employed even when the feudal sovereignty of the German empire did not exist. The question of mediatization was one of those affecting the internal welfare of Germany which were most keenly agitated in 1848. ME'DIATIZA'TION, n. *-tī-zā'shŭn*, the annexation of the smaller German states to larger contiguous ones, 1806. MEDIATOR, n. *mē'dĭ-ā-tŏr*, one who interposes between parties at variance in order to reconcile them; an intercessor; by way of eminence, a title of Christ Jesus as interceding Mediator for mankind with God as the Father, both with respect to his sacrifice of *Atonement* (q.v.)—making God and man *at one* again—and with respect to his continual intercession (q.v.). The Rom. Cath. Church represents *saints* as mediators of intercession, though not of atonement; but this view is rejected by Protestants. MEDIA'TRESS, n. fem. *-trĕs*, or ME'DIATRIX, n. fem. *-trĭks*, a woman who mediates or interposes for reconciliation. ME'DIATO'RIAL, a. *-tō'rĭ-ăl*, pertaining to a mediator or to mediation; having the character of a mediator. ME'DIA'TORSHIP, n. *-shĭp*, the office of a mediator. ME'DIATORY, a. *-tėr-ĭ*, mediatorial. MEDIATE AUSCULTATION, auscultation through a stethoscope—opposed to *immediate auscultation*, an auscultation made directly by the ear.—SYN. of 'mediator': propitiator; arbitrator; umpire; advocate; interceder.

MEDIC, or MEDICK, n. *mĕd'ĭk* [Gr. *mēdikē*, of or from *Media*, in Asia: L. *mēdĭcă*], (*Medicago*): genus of plants of nat. order *Leguminosæ*, sub-order *Papilionaceæ*, nearly allied to CLOVER (q.v. *Trifolium*), but distinguished from that and kindred genera by the sickle-shaped, or, in most species, spirally twisted, legume. The species, very numerous, are mostly annual and perennial herbaceous plants, with leaves of three leaflets like those of clover, natives of temperate and warm climates. Many are found in s. Europe. They generally afford good green food for cattle, and some are cultivated like the clovers for this use, among which the most important is PURPLE MEDIC, or LUCERNE (q.v., *M. sativa*). Besides this, the BLACK MEDIC, NONSUCH, or LUPULINE (*M. lupulina*), is one of the most generally cultivated. It receives the name Black Medic from the black color of the ripe pods, which are short, black, twisted, and arranged in oblong heads; and is often called Yellow Lucerne or Yellow Clover, from the color of its flowers. In habit and general appearance, it is very similar to *Trifolium procumbens*, or *T. Filiforme*. Where it is chosen, it is now sown frequently in mixture with Red Clover and Rye Grass, and is useful where a close turf is desired.

MEDICAL, a. *mĕd'ĭ-kăl* [F. *médical*, medical—from mid. L. *medĭcālis*—from L. *medĭcus*, a physician—from L. *medeor*, I heal or cure: It. and Sp. *medico*, a physician]: of or relating to the art of healing; medicinal; intended

to promote the study of medicine, as a medical school. MED'ICALLY, ad. *-lĭ.* MED'ICAMENT, n. *-kă-mĕnt* [F.—L.], anything used for healing diseases or wounds. MED'ICAMENT'AL, a. *-mĕnt'ăl,* relating to healing applications. MED'ICAMENT'ALLY, ad. *-lĭ.* MEDICATE, v. *mĕd'ĭ-kāt* [L. *medĭcātus,* healed, cured]: to give medicinal qualities to; in *OE.,* to heal. MED'ICATING, imp. MED'ICATED, pp.: ADJ. tinctured or impregnated with medicinal qualities. MED'ICABLE, a. *-kă-bl,* curable. MED'ICA'TION, n. *-kā'-shŭn,* the act or process of impregnating with medicinal substances. MED'ICATIVE, a. *-kā-tĭv,* tending to cure. MEDICINABLE, a. *mĕ-dĭs'ĭ-nă-bl,* having the power of a drug; able to heal. MEDICINAL, a. *mĕ-dĭs'ĭ-năl* [F.—L.]: having the properties of medicine; used in medicine: MEDIC'INALLY, ad. *-năl-lĭ,* in the manner of medicine; with a view to health. MEDICINE, n. *mĕd'ĭ-sĭn,* familiarly *mĕd'sĭn* [OF. *medicine*—from L. *medĭcīnă,* the healing art, medicine]: anything administered for the cure or mitigation of disease; the art of curing or alleviating disease; the practice and faculty of medicine (see MEDICINE, HISTORY OF; MEDICINAL PLANTS; MATERIA MEDICA): V. in *OE.,* to apply medicine for cure; to cure by medicine. MED'ICINING, imp. MED'ICINED, pp. *-sĭnd.* MEDICAL JURISPRUDENCE, application of medical science to the determination of certain questions in courts of law (see MEDICAL JURISPRUDENCE). MEDICAL MAN, a physician; a surgeon. MEDICATED SPIRITS, alcohol mixed or flavored with some strong ingredient. MEDICINAL WATERS, natural springs impregnated with certain medicinal qualities, and drunk by invalids. MEDICO-LEGAL, a. *mĕd'ĭ-kō-,* pertaining to law as affected by medical facts. MEDICINE MAN, among *N. Amer. Indians,* any person or thing that is wonderful, mysterious, or potent; a sorcerer or spirit doctor.

MEDICAL CODES: rules adopted by the medical profession to guide practitioners in relations with one another and with the public. What is known as the old code dates from Dr. Thomas Percival's *Medical Ethics, or a Code of Institutes and Precepts adapted to the Professional Conduct of Physicians and Surgeons* (Manchester, England, 1803). From 1832 to 1882 this code was in force generally in the U. S., until the Medical Society of the State of New York adopted a new code, which was more or less accepted elsewhere. The reasons for the change were that the old code was arbitrary, inoperative, and obsolete; and was contrary to law in refusing recognition to certain legally authorized and reputable schools of practice. The portion of the new code which was at first strongly objected to by many practitioners, and by the American Medical Association, was the clause on consultations, which set forth this rule: 'Members may meet in consultation legally qualified practitioners of medicine. Emergencies may occur in which all restrictions should, in the judgment of the practitioner, yield to the de-

mands of humanity.' The opposition to this recognition of all schools of practitioners recognized by state law, and to such extreme liberality in consultation, was warmly maintained for several years, but finally the American Medical Association adopted a declarative interpretation of certain points of the old code, which substantially brought it into harmony with the new, and also made a declaration that the code was advisory only and not obligatory.

MEDICAL DEPARTMENT, in the Navy: only of less importance than the same department in the army, in that the sea-service is much more healthful than service on land. After an action, the surgeon is in equal requisition in either case. For the Medical Department in the U. S. Navy, see UNITED STATES NAVY.

MEDICAL DEPARTMENT, of an Army: next to the commissariat, most important of all the non-combatant sections. The surgical treatment of the wounded in actual fighting, and, still more, the combat with disease engendered by crowding, unhealthy stations, and the reckless habits of the soldiery, necessitate a large medical staff; for, on an average of the whole army, it is found that the rate of sickness is at least triple that for the civil population.

In the British army, every battalion, when at home or in the temperate zone, has a surgeon and an assistant-surgeon; when in India or the tropics, another assistant-surgeon is added. In addition to these officers, there are numerous staff medical officers at all stations, who have charge of detachments, hospitals, etc. The medical department is governed by a director-general, who is a member of the war office, and has charge of the surgical, medical, and sanitary arrangements of the army. See SURGEON. For the Medical Department of the U. S. Army, see UNITED STATES ARMY.

MEDICAL JURISPRUDENCE: the science of applying medical knowledge to the purposes of legal investigation; the application of the principles and practice of various branches of medicine in judicial proceedings requiring the explanation of doubtful questions, such as those relating to conception and birth, time and cause of death, physical and mental diseases, etc. Medical jurisprudence is often spoken of as forensic medicine, that is, the medicine of the forum. It embraces subjects both purely medical and purely legal, and covers a very wide range. These questions have usually been considered under five divisions: (1) Such as arise out of the relation of sex, including impotency, pregnancy, legitimacy, and rape; (2) injuries to persons, as wounds, death from violence, poisoning, and abortion; (3) disqualification by different forms of mental diseases; (4) feigned disability or disease; (5) questions as to age, identity, and life insurance. The major part of what is known as medical jurisprudence relates to evidence given in courts, even if

the whole subject is not properly embraced within the subject of judicial evidence. As medical books can be used only in a very restricted sense in judicial proceedings, the testimony of medical experts has become very important. Our laws do not give recognized preference to any particular class or school of medical practitioners as qualified for expert witnesses. Knowledge is the test of qualification to give such evidence. The presiding judge passes, as a preliminary, upon the question of qualification, and determines whether the witness shall be permitted to testify. The opinion of a medical expert is never conclusive, but is simply to be regarded by the judge or jury in the same manner as other evidence given to assist in establishing a fact. The medical expert is frequently called upon to state facts, as well as to give his opinion based upon facts shown by other testimony to exist. He may testify as to the health of a patient whom he has treated, of his habits and mental traits. He may testify that he found poison in the stomach of a person found dead, and give an opinion as to whether the poison caused death. He may give an opinion as to how long a person has been dead, from the condition of the body when found; whether a certain wound would produce death; and his opinion as to the instrument used to inflict the wound.

In all of these subjects of investigation the evidence of a medical expert is almost indispensable. In matters of life insurance, where the insured dies shortly after a policy has been issued to him, medical expert examination and evidence are often of great importance, bearing upon the condition of the insured at the time of insurance, and upon the question of representations. In suits for injuries to persons through the fault of others the question of the extent and probable continuance of disability are to be investigated with the aid of expert evidence. Many questions of supposed crime could not be properly determined without the knowledge and skill of the physician, applied as science directs. In cases involving sanity and mental capacity medical jurisprudence reaches the zenith of its importance. The untrained non-scientific mind cannot measure the status and capacity of other minds. If it is difficult, sometimes nearly impossible, for the best informed to determine accurately the physical condition of a person, none but those eminent for knowledge of and experience in matters of the mind ought to judge of its condition and hazard opinions as to its peculiarities and capacity. Insanity is a disease of the mind which assumes many forms—almost as many as there are different phases in the human mind. Many definitions are given of insanity, one of which is that it is a physical disease located in the brain, which deranges the mental and moral faculties to a greater or less degree. This definition is not quoted in preference to any other for the purpose of approval, but because it

differs so radically from others, and to show the difficulty of comprehending the nature of this dread malady. The general term insanity comprehends all shades of mental diseases, from the slightest abnormal condition to that of the wildest maniac. The expert alienist is called upon to testify as to a person's ability to make a will, a contract, or to transact any kind of business. He is asked to decide whether a person is bereft of his normal reason to the extent that prudence requires his confinement; and when he has been confined, whether it would be safe or prudent to let him have his liberty. The questions upon which the expert's opinion with regard to the insane, or those supposed to be insane, are asked can hardly be enumerated. The importance of the subject cannot be overestimated, and new and earnest efforts are being constantly exerted by the medical profession to render its information upon this difficult subject as full and complete as possible.

MEDICAL PRACTITIONER, in Law: in the absence of any special statutes, a person who publicly announces himself a practitioner in medicine and who undertakes to treat the sick either for or without a reward. In most of the states there are statutes regulating the right to practice medicine, the requirements generally being a diploma from some recognized medical college, or a certificate from a medical board of examiners; a public register is kept of the names of all legalized practitioners. Usually, when there are such statutes, it is a penal offense to practice without having fulfilled the statutory conditions. Formerly physicians could not sue for their fees, the policy of the law being to raise the relation between physician and patient above all that partook of a mercenary character. The law now implies a promise on the part of the patient to pay for the services rendered, and implies an agreement on the part of the physician that he possesses at least the ordinary skill of his profession, and makes him liable for any malfeasance on his part. The law leaves physicians free to accept or refuse a call upon them; but while their service is thus always voluntary at the start, they are under legal obligation to continue to treat the case and to use all necessary diligence and skill to bring it to a successful termination. A physician may, however, withdraw from a case for good cause and after proper notice to the patient. Medical practitioners are classed as physicians and as surgeons; but in law there is no distinction between physicians and surgeons: though their labors are different, their responsibilities are analogous. The relation between physician and patient is a confidential one; and generally, throughout the states, physicians are not allowed to disclose any information which they have acquired from their patients while attending them in a professional character.

MEDICAL PSYCHOLOGY. See PSYCHOTHERAPEUTICS.

MEDICI, *mĕd'e-chē* or *mā'de-chē*, THE: Italian family, among the most distinguished families of the Florentine republic; of high renown for statesmanship and for munificent patronage of literature and art. The M. owe their earliest distinction to their success in various branches of commerce, and the liberal public spirit in which they used their wealth. From the beginning of the 13th c., they took part in all the leading events of the republic; and from the period when *Salvestro de' M.* (d. 1388) attained the rank of gonfaloniere, 1378, the family rose rapidly to pre-eminence; though its almost regal greatness for several centuries is due especially to *Giovanni de' M.* (1360–1429, son of Bicci de' M.), of another branch of the family, who left to his sons, Cosmo and Lorenzo, a vast heritage of wealth gained in trade, beyond all previously known in the republic.

With COSMO DE' M. (Cosmo the Elder, 1389–1464), on whom was gratefully bestowed the title 'Father of his country,' began the glorious epoch of the M.; his descendants for many generations were absolute rulers of the nominal republic of Florence: while from *Lorenzo de' M.* (1395–1440) descended the collateral branch of the family, which, in the 16th c., obtained absolute rule over Tuscany. Cosmo's life—except during a short period, when the Albizzi and other rival families re-established a successful opposition against the policy and credit of the M.—was one uninterrupted course of prosperity. He continued the early policy of his family by leading the popular resistance to the chief families, such as the Albizzi, who had claimed dominance in the state. He was a munificent patron and a successful cultivator of art and literature, and did more than any sovereign in Europe to revive the study of the ancient classics, and to foster a taste for mental culture. He assembled around him learned men of every nation, and gave liberal support to numerous Greek scholars, whom the subjection of Constantinople by the Turks had driven into exile; and by his foundation of an academy—important in later Italian scholarship—for the study of the philosophy of Plato, and of a library of Greek, Latin, and Oriental MSS., he inaugurated a new era in modern learning and art. Yet though he held no definite office, and retained the name of a republican government, nominally confiding the executive authority to a gonfaloniere and eight priori or senators, he extinguished the freedom of Florence. He was always amassing wealth in trade and by intrigue; and always extending his influence, either by gentle methods, or by villainy, of which all testimony shows him to have been capable.

LORENZO the Magnificent (1449–92), grandson of Cosmo, who succeeded to undivided and absolute power in the state after the murder of his brother Giuliano, 1478, pursued, with signal success, the policy of his family, which may be characterized as tending to ennoble individuals, depress the greater families and exalt the less, and debase the nation at large. He encouraged literature and the

arts, employed learned men to collect choice books and antiquities for him from every part of the known world, established printing-presses in his dominions as soon as the art was invented, founded academies for the study of classical learning, and filled his gardens with collections of the remains of ancient art; but when his munificence and conciliatory manners had gained the affection of the higher and the devotion of the lower classes, he lost no time in breaking down the forms of constitutional independence that he and his predecessors had suffered to remain. Some few Florentines, alarmed at the progress of the voluptuous refinement which was smothering every spark of personal independence, tried to check the corruption by an ascetic severity of morals, which gained for them the name *piagnoni*, or weepers. Foremost among them was the Dominican friar Girolamo Savonarola (q.v.), whose eloquent appeals to the people, for purity and righteousness and in favor of a popular and democratic government, threatened for a time the overthrow of the M.; but the jealousy of the Franciscans, and the vindictiveness of the papal court, averted their doom, and Savonarola's martyrdom restored outward tranquillity to Florence, and left the M. in undisturbed possession of absolute power. Lorenzo the Magnificent became the actual tyrant of Florence: cultivated in intellect and in taste, superb in manner, reckless in expenditure, now conciliatory and now cruel and murderous, as his selfish interests dictated, scandalously immoral, he yet governed so sagaciously that industry and commerce flourished, and material prosperity was carried to a high degree. He caused Pope Innocent VIII. to make his son, Giovanni de' M., a cardinal at the age of 14: this cardinal was afterward Pope Leo X.

Pietro de' M. (1471–1503), son and successor of Lorenzo in 1492, possessed neither capacity nor prudence; and in the troubles which the ambition of the princes and the profligacy of the popes brought upon Italy, by plunging her into civil and foreign war, he showed himself treacherous and vacillating alike to friends and foes. Lodovico Sforza, surnamed the 'Moor,' relying on the friendship, since the middle of the 15th c., between the Sforza family of Milan and the M., applied to him for assistance in establishing his claim to the duchy of Milan; but seeing that no reliance could be placed on Pietro, he threw himself into the arms of Charles VIII. of France. The result was the invasion of Italy by a French army of 32,000 men. Pietro, in hopes of conciliating the powerful invader, hastened to meet the troops on their entrance into the dominions of Florence, and surrendered to Charles the fortresses of Leghorn and Pisa. The magistrates and people, incensed at his perfidy, drove him from the city, and formally deposed the family of the M. from all participation in power. Pietro (drowned 1503, while with the French army) and several of his kinsmen made ineffectual attempts to recover their dominions, which were not restored till 1512.

The elevation of GIOVANNI DE' M. (1475–1521), son of Lorenzo the Magnificent, to the papal chair, under the title Leo X., completed the restoration of the family to their former splendor; while the accession, 1523, of his cousin, GIULIO DE' M. (natural son of Giuliano, who was son of Lorenzo), to the pontificate as Clement VII. (q.v.), and the marriage of *Catharine de' M.* (1519–89), granddaughter of Pietro, to Henry II. of France (see CATHARINE DE' MEDICI), and her long rule over that country as regent for her sons, together with the military power of the cadet branch (descended from a younger brother of Cosmo the Elder, 'Father of his country'), threw a weight of power into the hands of the M., which rendered all attempts to maintain even a show of independence futile on the part of the Florentines. The faintest indication of republican spirit was at once crushed by the combined aid of the pope and Charles V.; and though the legitimate male line of Cosmo was extinct (with the exception of Pope Clement VII.), the latter gave, 1529, to ALESSANDRO DE' M., natural son of the last prince Lorenzo II., the rank of Duke of Florence. Alessandro was utterly profligate, abandoned to all shameless vices; and on his death, 1537, by assassination, without direct heirs, the pope raised to the ducal chair *Cosmo I.* (1519–74), son of Giovanni de' M. and Caterina Sforza), descendant of a collateral branch.

COSMO I., known as the Great, possessed the astuteness of character, the intellectual capacity, the resoluteness and courage, the love of elegance and taste for literature, but not the openness of manner and the liberality that had distinguished his great ancestors; and, while he founded the academies of painting and of fine arts, made collections of paintings and statuary, published magnificent editions of his own works and those of others, and encouraged trade, for the protection of which he instituted the ecclesiastical order of St. Stephen, he was implacable in his enmity, and scrupled not utterly to extirpate the race of the Strozzi, hereditary foes of his house. He put to death all who resisted his will, beheading of such, during his reign, 140 men and 6 women, besides sending his assassins into foreign countries to dispatch with daggers his fugitive enemies. His acquisition of Siena gained for him the title Grand Duke of Tuscany from Pius V.; and he died 1574, leaving enormous wealth and regal power to his descendants, who, throughout the next half century, maintained the literary and artistic fame of their family. Cosmo's son and successor, FRANCESCO I. (1541–87), was suspicious, treacherous, despotic, and scandalously immoral. The annals of the court and of the private life of the period are stained with bloody and disgraceful incidents. The daughter of Francesco or Francis, *Marie de' M.*, married Henri IV. of France (see MARIE DE' MEDICI).—His brother and successor, FERDINAND I. (1549–1609), was a clement and sagacious ruler, under whom the country prospered.

In the 17th century, the race rapidly degenerated; and after several of its representatives had suffered themselves to be made the mere tools of Spanish and Austrian ambition, the last male representative of the line, GIOVAN GASTONE DE MEDICI (1670-1737), came into power, a weak, worn-out debauchee, son of Cosmo III. and of Louise d'Orleans, who was niece of Louis XIV. of France. His death left Tuscany poor, decayed, and exhausted under generations of misrule. His only sister, the Electress Palatine, last of the Medici family, expired 1743. In accordance with a stipulation of the Peace of Vienna, the grand duchy of Tuscany passed to the house of Lorraine.

MEDIC'INAL PLANTS: plants of which some part or product is used in medicine. They are very numerous, and of most widely different orders. In some orders, particular properties are prevalent; other medicinal species are exceptional as to their properties in the orders to which they belong. Important properties and products are sometimes characteristic of a particular very limited group of species, as in the case of the *Cinchonas*. Many medicinal plants are used only by the people of the countries in which they grow; others have a place accorded them in pharmacopœias and in the practice of educated medical practitioners. Some medicinal plants are always gathered where they grow wild; others are cultivated in order to have them in sufficient abundance.

MEDICINE, HISTORY OF: account of the culture and advancement of the healing art. There is reason to believe that Egypt was the country in which first the art of medicine, as well as the other arts of civilized life, was cultivated with success, the offices of the priest and the physician being probably combined in the same person. In the writings of Moses, there are various allusions to the practice of medicine among the Jews, especially with reference to the treatment of leprosy. The priests were the physicians, and their treatment aimed mainly at promoting cleanliness and preventing contagion. Mythology credits Chiron (q.v.), the centaur, with having introduced the art of medicine among the Greeks. See ÆSCULAPIUS.

With a passing allusion to the names of Pythagoras, Democritus, and Heraclitus, who in their various departments may be regarded as having advanced the art of medicine, we arrive at the time of Hippocrates (q.v.). His advance was so great that no attempts were made for some centuries to improve on his views and precepts. His sons, Thessalus and Draco, and his son-in-law, Polybius, are regarded as the founders of the medical sect called the Hippocratean or Dogmatic school, 'because it professed to set out with certain theoretical principles which were derived from the generalization of facts and observations, and to make these principles the basis of practice.

The next notable point in the history of medicine is

the establishment of the school of Alexandria, by the munificence of the Ptolemies, about 300 years B.C. Among the most famous of its medical professors are Erasistratus and Herophilus. Erasistratus was pupil of Chrysippus, and probably imbibed from his master his prejudice against bleeding and against active remedies, preferring to trust mainly to diet and to the *vis medicatrix naturæ*. It was about this time that the Empirics formed themselves into a distinct sect, and became the declared opponents of the Dogmatists. The controversy, says Bostock, *History of Medicine*, really consisted in the question, how far we are to suffer theory to influence our practice. While the Dogmatists, or, as they were sometimes styled, the Rationalists, asserted that, before attempting to treat any disease, we ought to make ourselves fully acquainted with the nature and functions of the body generally, with the operation of medical agents upon it, and with the changes which it undergoes under the operation of any morbid cause, the Empirics, on the contrary, contended that this knowledge is not obtainable, or, if obtainable, not necessary; that our sole guide must be experience, and that if we step beyond this, as gained either from our own observation or from that of others on whose testimony we can rely, we are always liable to fall into dangerous, and often fatal, errors. According to Celsus, who gives an excellent account of the leading opinions of both sects, the founder of the Empirics was Serapion of Alexandria, said to be pupil of Herophilus. At this period, and for centuries subsequent to it, all physicians were included in one or other of these rival sects, and, apparently, the numbers of the two schools were about equal.

We learn from Pliny that medicine was introduced into Rome at a later period than the other arts and sciences. The first person who seems to have made it a distinct profession was Archagathus, a Peloponnesian, who settled at Rome about B.C. 200. His treatment was so severe and unsuccessful that he was finally banished; and we hear of no other Roman physician for about a century, when Asclepiades of Bithynia acquired great reputation. His popularity depended on his allowing his patients the liberal use of wine and of their favorite dishes, and in all respects consulting their inclinations and flattering their prejudices. He was succeeded by his pupil Themison of Laodieca, founder of a sect called Methodics, who adopted a middle course between the Dogmatists and Empirics. During the greater part of the first two centuries after Christ, the Methodics were the preponderating medical sect, and they included in their ranks C. Aurelianus, some of whose writings have come down to us. They then parted into various sects, of which the chief were the Pneumatics, represented by Aretæus of Cappadocia, whose works are still extant; and the Eclectics, of whom Archigenes of Apamea was most cele-

brated. But the most remarkable writer of this age is Celsus (q.v.), not far from the time of Christ, whose work *De Medicina* gives a sketch of the history of medicine till his time, and the state in which it then existed. He is remarkable as the first native Roman physician whose name has been transmitted to us. The names of Andromachus, inventor of the Theriaca, a preparation retained in modern pharmacopœias until the close of the 18th c., of Pliny the naturalist, and of Dioscorides, must have place in even the briefest sketch of the early history of medicine; but their contributions to its progress are insignificant when compared with those of Galen (A.D. 130—about 201: see GALENUS), whose writings were universally acknowledged as ultimate authority, until they were attacked and publicly burned in the 16th c. by the archquack, Paracelsus (q.v.). As in the case of Hippocrates, Galen's immeasurable superiority over his contemporaries seems to have acted as a check to attempts at further improvement.

The first names of any renown after the death of Galen are those of Oribasius, Alexander of Tralles, Ætius, and Paulus Ægineta, 4th to 7th c. They all were zealous Galenists, and those of their writings which are extant are mostly compilations from their predecessors, and especially from their great master. With the death of Paulus, the Greek school of medicine may be considered to have come to an end, for after his time no medical works of any merit were written in this language. The Arabian school was then beginning to rise into notice. The earliest Arabic writer on medicine of whom we have certain account is Ahrum, contemporary with Paulus. The most celebrated physicians of this school were Rhazes (9th c., the first to describe the small-pox), Avicenna (q.v.) (11th c., whose *Canon Medicinæ* may be regarded as a cyclopedia of all then known of medicine and the collateral sciences), Albucasis (whose works on the practice of surgery were for several ages regarded as standard authorities), Avenzoar, and Averrhoes (q.v.) (12th c., equally celebrated as physician and as philosopher). The works of Hippocrates and Galen, which, with those of Aristotle, Plato, and Euclid, were translated into Arabic in the 9th c., formed the basis of their medical knowledge; but the Arabian physicians did good service to medicine in introducing new articles from the East into the European materia medica—e.g., rhubarb, cassia, senna, camphor—and in making known the elements of pharmaceutical chemistry—e.g., a knowledge of distillation and of the means of obtaining various metallic oxides and salts.

Upon the decline of the Saracenic universities of Spain, which may date from the death of Averrhoes, about 1200, the only medical knowledge which remained was in Italy, where the school of Salerno acquired considerable celebrity, which it maintained till it was gradually eclipsed

by the rising fame of other medical schools at Bologna —where Mondini publicly dissected two human bodies 1315—Vienna, Paris, Padua, etc. Contemporary with Mondini lived Gilbert, first English writer on medicine who acquired repute; and the next century gave birth to Linacre, who, after studying at Oxford, spent considerable time at Bologna, Florence, Rome, Venice, and Padua, and subsequently became founder of the London College of Physicians. It was in this (the 15th) c. that the sect of Chemical Physicians arose, who maintained that all the phenomena of the living body may be explained by the same chemical laws as those which rule inorganic matter. The chemists of that age, with Paracelsus at their head, did nothing to advance medicine, except to introduce into the materia medica several valuable metallic preparations.

This period seems to have been prolific in originating new diseases. It is in the 13th, 14th, and 15th c. that we hear most of leprosy and of visitations of the plague in Europe. Until the 15th c. hooping-cough and scurvy were unknown or not accurately described; and it was toward the close of that century that syphilis was first recognized in Italy (from which country it rapidly extended over all Europe), and that the Sweating Sickness (*Sudor Anglicanus*) made its first appearance in England.

In the 16th c., the study of human anatomy may be said to have been first fairly established by the zeal and labors of Vesalius (q.v.); and in this and the succeeding century were many physicians whose anatomical and physiological investigations materially tended directly or indirectly to advance the science of medicine. This was the epoch of Eustachius, Fallopius, Asellius, Harvey, Rudbeck, Bartholin, Malpighi, Glisson, Sylvius, Willis, Bellini, etc. Chemistry was then separating itself from alchemy, and advancing into the state of a science; and a combination was formed between its principles and those of physiology, which gave rise to a new sect of chemical physicians, quite distinct from the sect represented two centuries previously by Paracelsus. They considered that diseases were referable to certain fermentations in the blood, and that certain *humors* were naturally acid, and others naturally alkaline, and according as one or other of these predominated, so certain specific diseases were the result, which were to be removed by the exhibition of remedies of nature opposite to that of the disease. They were soon succeeded by the Mathematical Physicians, or the Iatro-mathematical school, of which Borelli, Sauvages, Keill, Jurin, Mead, and Freind were among the most celebrated. In proportion as this sect gained ground, that of the chemists declined, while the old Galenists were fast disappearing. To these rival sects must be added that of the Vitalists, which originated with Van Helmont (q.v.), and whose views, with some modifications, were adopted by Stahl

and Hoffmann. The greatest physician of the 17th c. was, however, unquestionably Sydenham (q.v.), who, though inclining toward the chemical school, did not allow his speculative opinions regarding the nature of disease to interfere with his treatment.

The most eminent teacher of medicine in the early part of the 18th c. was Boerhaave, elected to the chair of medicine at Leyden 1709. Among the pupils of Boerhaave must be especially mentioned Van Swieten, whose commentaries on the aphorisms of his master contain a large and valuable collection of practical observations, and Haller (q.v.), father of modern physiology; while among the most celebrated opponents of the Hallerian theory, that irritability and sensibility are specific properties of the muscular and nervous systems, must be mentioned Whytt and Porterfield, physicians of high reputation in Edinburgh—the former being professor of medicine in the university.

Nearly all the distinguished physicians of the latter part of the 18th c. belonged to what may be termed the Cullenian school of medicine: for the doctrines of that celebrated physician, see CULLEN. His views were attacked with great acrimony by his former assistant, John Brown, founder of the Brunonian system of medicine. In England the views of Brown were regarded as too purely theoretical, and did not acquire popularity; but in parts of continental Europe, especially in Italy, they were generally adopted, and became for a considerable time prevalent in several leading medical schools. To supplement this outline of the progress of medicine in the 18th c., reference may be had to the biographical sketches of Monro, Blane, the Hunters, Jenner, etc.

The 19th c. may be considered as the epoch of physiological experiment and clinical observation. The efficient laborers in the field of medicine during this century have been so numerous as to preclude a catalogue here, while an attempt to select the most celebrated would be invidious. Our materia medica has received a large number of most important additions, among which may be especially noticed quinine, morphine, strychnine, iodine and the iodides, the bromides, hydrocyanic acid, cod-liver oil, chloroform. The physical diagnosis of disease has been facilitated to an extent far beyond what the most sanguine physician of last century could have deemed possible, by the discovery and practical application of the stethoscope, the speculum, the ophthalmoscope, and the laryngoscope; while chemistry and the microscope have been successfully applied to the investigation of the various excretions, and especially of the urine and its deposits. The discovery of vaccination as a means of preventing small-pox, though made (see JENNER) at the close of the 18th century, may be regarded practically as belonging to the 19th, since considerable time elapsed before its value was generally recognized. The true and

certain diagnosis between typhus and typhoid fever was due to the labors of physicians living until late in the 19th century; and the discoveries of Bright's disease of the kidneys and of Addison's disease of the suprarenal capsules died in that century.

The pathological anatomy of Rokitansky and Virchow (q.v.); the development of the methods of auscultation and percussion established by Laennec (q.v.); the antiseptic method of Lister, have brought advances whose value cannot be overestimated, while the discovery of the part taken by bacteria in the infectious diseases points the way to the eventful overthrow of these scourges of mankind.

MEDICINE MAN: among the American Indians, South Sea Island tribes and other savages, a man supposed to possess mysterious healing powers. Among most savages the medicine man occupies much the same position as that held in civilized communities by two of the learned professions—medical and clerical. The medicine man is both priest and physician, and is at once the repository of all that a tribe knows, fears, and believes. In very low stages of human development, however, he is at best only a magician, dealing in terrors, possessed of occult powers, but laying claim to no special medical knowledge. Thus, among the aborigines of North Queensland, the tribal doctors do not attend on the sick—an invalid being cared for by wife or mother. They are not ostentatious, a medicine man being distinguished by no insignia save a small bag in which his talismans, death charms, and other 'credentials' are carried.

Among the North American Indians medicine men are treated with great respect, and form a secret society with exclusive privileges and 'exercise a terrible influence in degrading the people.' It is curious to find that, as in Australia, the Indian medicine men are chiefly concerned to do positive harm. In co-operation with good and bad spirits, they bring about the deaths of men or dogs at a distance. Among the Ojibways they are a kind of brokers in vengeance, and a coward or a hypocrite who wishes to be covertly avenged upon an enemy will bribe his tribal medicine man to employ the medical attendant of his victim. Then, if the victim dies, the instigators remain unsuspected, and the actual perpetrator of the crime probably goes scot free. Indian medicine men affect to suck out poison from a patient's body, or they cough up an arrow point or small, sharp piece of stone or bone which they suppose has been transformed from him to them by the evil spirit of another sorcerer. The medicine men of the Eskimos are even more extravagant in their pretensions. They profess themselves able to change into wood, stone, or animal, or even to walk on the water, or to fly, but they make a condition, which is that 'no one must see them.' An Eskimo medicine man rubs the seat of his patient's disease, blows on the part, and then with-

draws his hand, 'slowly and as if with difficulty, in order to show that he is hauling out a very heavy weight of pain.' 'At the same time he looks upward, rolls his eyes, and groans.' Then he throws the disease violently away, and breathing more freely, demands immediate payment of his fee.

MEDIETA'TE LIN'GUÆ, Jury de. See Jury.

MEDIEVAL, a. See Mediæval.

MEDILL, *mĕ-dĭl'*, Joseph: American journalist: b. New Brunswick, Canada, 1823, Apr. 6; d. San Antonio, Tex., 1899, Mar. 16. Having early removed to Massillon, Stark county, Ohio, he was admitted to the bar in 1846, practised at New Philadelphia, and in 1849-51 published at Coshocton the *Republican*, a Free-Soil paper. In 1852, he established at Cleveland the *Forest City*, a whig organ, which in 1853 was united with the *Free Democrat*, and called the *Leader*. In 1855, he sold his interest in the *Leader*, removed to Chicago, with two partners purchased the *Tribune*, advocated radical anti-slavery measures, and supported Lincoln in 1860. He was a member of the Illinois constitutional convention of 1870; United States civil service commissioner in 1871, and in that year was elected mayor of Chicago. In 1874, became editor-in-chief of the Chicago *Tribune*.

MEDINA, *mā-dē'nâ*, rather El-Medi'na (the City), or in full, Medinat Rasul Alla (City of the Apostle of God), or Medinat al Nabi (City of the Prophet); called also Tabah, Tibah, etc. (the Good, Sweet, etc.), and mentioned by Ptolemy as Jathrippa: town in w. Arabia, the holiest city to Mohammedans next to Mecca, and the second capital of Hedjaz; about 270 m. n. of Mecca, and 140 n. by e. of the port of Jembo on the Red Sea. It consists of three principal parts—a town, a fort, and suburbs of about the same extent as the town itself, from which they are separated by a wide space (the Munakha). Medina is about half the size of Mecca, and forms an irregular oval within an inclosure whose walls are 35 to 40 ft. high, and flanked by 30 towers—a fortification which renders Medina the chief stronghold of Hedjaz. Two of its four gates—viz., the Bab Al Jumah (*Friday Gate*, in the eastern wall) and the Bab Al Misri (*Egyptian*)—are massive buildings with double towers. The streets, 50 to 60 in number, are deep and narrow, paved only in a few places. The houses are flat-roofed and double-storied, and are built of a basaltic scoria, burned brick, and palm-wood. There are few public buildings of any importance except the Great Mosque Al Haram (the Sacred), supposed to be erected on the spot where Mohammed died, and to inclose his tomb. It is of smaller dimensions than that of Mecca, being a parallelogram 420 ft. long and 340 ft. broad, with a spacious central area, called El Sahn, surrounded by a peristyle, with numerous rows of pillars. The Mausoleum, or

Hujrah, itself is an irregular square, 50 to 55 ft. in extent, in the s.e. corner of the building, and separated from the walls of the mosque by a passage about 26 ft. broad. A large gilt crescent above the 'Green Dome,' springing from a series of globes, surmounts the Hujrah, a glimpse into which is attainable only through a little opening, called the Prophet's Window; but nothing more is visible to the profane eye than costly carpets or hangings, with three inscriptions in large gold letters, stating that behind them lie the bodies of the Prophet of Allah and the two caliphs—which curtains, changed whenever worn out or when a new sultan ascends the throne, are supposed to cover a square edifice of black marble, in the midst of which stands Mohammed's tomb. Its exact place is indicated by a long pearly rosary (Kaukab Al Durri) —still visible in 1855—suspended to the curtain. The Prophet's body is supposed to lie (undecayed) stretched at full length on the right side, with the right palm supporting the right cheek, the face directed toward Mecca. Close behind him is placed, in the same position, Abu-bekr, and behind him Omar. The fact, however, is, that the mosque was entirely reconstructed 711, was enlarged 781, was rebuilt after being burned 1256, and was almost completely reconstructed after a second fire 1481. These facts, with other reasons, make it doubtful whether the particular spot at Medina really contains the Prophet's remains. That his coffin, said to be covered with a marble slab and cased with silver (no European has ever seen it), rests magnetically suspended in the air, is a silly story, invented by Europeans and not known to Mohammedan tradition. Of the fabulous treasures which this sanctuary anciently contained, little now remains. As in Mecca, a great number of ecclesiastical officials are attached in various capacities to the Great Mosque, as Ulemas, Mudarisin, Imaums, Khatibs, etc.; and not only they, but the townspeople themselves, live to a great extent only on the pilgrims' alms. There are few other noteworthy spots in Medina, except the minor mosques of Abu-bekr, Ali, Omar, Balal, etc. The private houses, however, surrounded by gardens, fountains, etc., have a pleasing appearance; and the city, though in decay, is yet a busy and agreeable place. Thirty Medresses, or public endowed schools, represent what learning there is left in the city, formerly famed for its scholars. Pop. estimated 16,000 to 20,000.

MEDINA, *me-dī'na:* N. Y., village, in Orleans county; on Oak Orchard creek, and on the Erie canal, and on the New York Central & Hudson River railroad; about 35 miles northeast of Buffalo and 12 miles from Lake Ontario. The first settlement was made about 1830. In 1832, it was incorporated as a village. It is in a fertile agricultural region in which the chief products are grapes, apples, strawberries, and other fruits, and dairy products. In the vicinity are valuable sandstone quarries,

from which is obtained excellent building stone. The water-power is excellent and has been increased by a storage dam. Electricity is used as a power in manufacturing as well as for light. The chief manufactures are pumps, iron, foundry products, shirts, shoes, vinegar, flour, and furniture. It has a large trade in fruit and sandstone. The Medina Falls are visited annually by a number of tourists. The government is vested in a president and board of trustees. Pop. (1900) 4,716.

MEDINA SIDONIA, *mā-thē'nâ sē-dō'nē-â* (Arab. *Medinatu-Shidunah*, 'City of Sidon,' so called by the Moors because they conjectured it to be the site of the Phœnician *Asidon*): city of Spain, 25 m. e.s.e. of the city of Cadiz. It has a picturesque and splendid appearance at a distance; but within it is described as 'a whitened sepulchre full of decay.' It is of Moorish origin, and contains a beautiful Gothic church and extensive ruins of a castle. The town gives the title of duke to the descendants of the famous Guzman the Good, and is otherwise noted in history. There are manufactures of earthenware. Pop. 12,500.

MEDI'NET-EL-FAYUM. See FAYUM.

MEDIOCRE, a. *mē'dĭ-ō-kėr* [F. *médiocre*—from L. *mediōcrem*, middling, tolerable—from *mediŭs*, middle: It. *mediocre*]: of moderate degree; middle rate: N. a person of middling, or but indifferent, talents or merit. ME'DIOC'RITY, n. *-ŏk'rĭ-tĭ* [F. *médiocrité*]: a moderate degree of rate; a middle degree. *Note.*—These words as now used imply disparagement, with a slight degree of contempt.

MEDITATE, v. *mĕd'ĭ-tāt* [L. *meditātus*, considered, meditated upon: It. *meditare;* F. *méditer*]: to think on; to revolve or plan in the mind; to muse; to employ the thoughts closely. MED'ITATING, imp. MED'ITATED, pp.: ADJ. thought over; planned. MED'ITA'TION, n. *-tā'shŭn* [F.—L.]: close and deep thought; a series of thoughts occasioned by any subject; continued serious thought. MED'ITATIVE, a. *-tā-tĭv* [F. *méditatif*—from L. *meditātīvus*]: addicted to meditation; expressing meditation or design. MED'ITATIVELY, ad. *-tĭv-lĭ.* MED'ITATIVENESS, n. —SYN. of 'meditate': to reflect; contemplate; ponder; consider; regard; intend; study; dwell on; ruminate; cogitate; design.

MEDITATIO FUGÆ, *mĕd-ĭ-tā'shĭ-ō fū'jē:* phrase in Scotch law denoting an intention to abscond from the jurisdiction of the ordinary courts; used chiefly in reference to debtors. The acts abolishing imprisonment for debt in general expressly retain it in the case of Meditatio Fugæ (see DEBT, IMPRISONMENT FOR).

MEDITERRANEAN, a. *mĕd'ĭ-tĕr-rā'nē-ăn* [L. *mediŭs*, middle; *terra*, land or earth: F. *Méditerrané*]: lying between two lands; inclosed by land: N. the sea lying between Europe and Africa. MED'ITERRA'NEOUS, a. *-nĕŭs*, mediterranean; inland.

MEDITERRANEAN Sea, *měd-ĭ-tĕr-rā′nē-an*: named from its being inclosed by the continents of Europe, Asia, and Africa; one of the largest inland seas in the world. Its length from e. to w. is about 2,100 m., its greatest breadth about 1,080, but it is divided into two great basins by the approach of the European and African coasts in its middle; area inclusive of the Sea of Marmora, but exclusive of the Black Sea and Sea of Azov, abt. 1,000,000 sq. m. It is abt 400 m. wide opposite the mouth of the Rhone, and 0 m. wide opposite the mouth of the Nile. It is connected at its w. end with the Atlantic Ocean by the Straits of Gibraltar, through which a strong current continually flows into the Mediterranean. Another strong current also flows into its n.e. end through the Hellespont, the Sea of Marmora, and the Bosphorus, from the Black Sea, which receives large supplies of fresh water, whereas the great rivers which fall into the M. itself are comparatively few, the principal being the Ebro, the Rhone, and the Po, from Europe; and the Nile, from Africa. There are indeed two currents through the Straits of Gibraltar—one superimposed upon the other the lower current usually an outflow into the Atlantic the upper current usually an inflow from the Atlantic. This arrangement, however, is variable to some extent with the tides, etc. Similarly, through the Dardanelles there is a lower outflow of dense, salt, warm M. water to the Black Sea; and an upper inflow of fresher, cooler Black Sea water into the Mediterranean. The M. receives no large river from Asia. The evaporation from the surface of the M. is, on the contrary, greater than from the surface of the ocean generally, owing to the heat from the African deserts and the shelter which mountains afford from the cold winds of the north. The surface temperature, dependent on the intensity of solar radiation, is in summer about 5° above that of the Mediterranean. By the expeditions for the scientific exploration of the Deep Sea, 1869 and 70, it has been ascertained that the effects of this surface heating are limited to a depth of 100 fathoms; at every depth beneath this, even down to 1,900 fathoms, the temperature of the M., unlike that of the Atlantic, is *uniform*, and stands about 54° or 55°. This is, in fact, the *winter* temperature of the entire contents of the basin, from the surface downward, and also the mean temperature of the crust of the earth in that region. In winter, the temperature of the M., and the Atlantic approximate very closely. In consequence probably, of the greater evaporation, the water of the M., unlike that of inland seas in general, contains about $\frac{1}{6}$th per cent. more salt than the Atlantic Ocean. Its specific gravity is almost everywhere greater than that of the Atlantic, being in the proportion of 1·0386 to 1·0283. Its color, when undisturbed, is a bright deep blue; but in the Adriatic a green, and in the Levant a purple, tinge prevails, while the dark hue of the Euxine is indicated in its name of 'Black Sea.' Different parts of the M. bear different names—as the

Ægean Sea, the Ionian Sea, the Adriatic Sea or Gulf of Venice, etc. Its n. coast is very much broken with bays and peninsulas, and abounds in harbors, affording the inhabitants of s. Europe great advantages for commerce, of which the M. was the chief seat during all periods of history, till toward the close of the middle ages, when, after the invention of the mariner's compass, a spirit of maritime adventure sprang up, and the discoveries of the Portuguese and of Columbus led to the extension of commerce over the whole world. The commerce of the Egyptians, the Phœnicians, the Greeks and Romans, was almost entirely confined to this inland sea.

The depth of the M. is generally greatest in its w. basin, though the maximum depth known in the w. is 12,240 ft., and in the e. 15,000 ft. Near Nice, it is 4,200 ft. deep only a few yards from the shore. In many places it is 5,000 ft. deep and more. Between Marseille and Algiers, the depth is 7,200 to 9,600 ft.; between Naples and Sardinia, 9,000 to 12,000 ft.; between Alexandria and Cyprus, 5,400 to 6,600 ft. The depth in the Straits of Gibraltar is about 5,500 ft. It is highly probable that the coasts of Europe and Africa were once united here, and have been separated by some great convulsion; it is supposed also that land formerly stretched from Sicily to Cape Bon, in Africa, where now a ridge exists along which there is for the most part a depth of scarcely 200 ft., and in some places of little more than 40 ft., while on each side, at a short distance, the depth is more than 6,000 ft. The M. is subject to the w., n., and n.e. winds for more than two-thirds of the year, while in spring the s.e. and s.w. winds prevail. The most formidable of those winds peculiar to the M. is the *solano* or *levanter*. In the Gulf of Venice, the greatest tides rise about three ft., and in the Great Syrtis, five ft., but in most places the tides are scarcely observable. According to the measurements of Napoleon's Egyptian expedition (1799), the surface of the M. in the neighborhood of Alexandria was 24 to 30 ft. lower than that of the Red Sea at Suez; but more recent measurements have shown that the difference of level is inconsiderable, and that the mean level of the Red Sea is at most six inches higher than the Mediterranean.

Of the 643 species of European sea-fishes, 444 inhabit the M., some of which are peculiar to it. It has a greater number of species than the British and Scandinavian seas, but does not nearly so much abound in useful kinds. Tunny-fishing is extensive on some parts of its coasts. It is rich in red coral, which is procured in great quantity on the coasts of Provence, of the Balearic Isles, and of Sicily, but particularly on the coasts of Bona and Barca in Africa.

The shores of the M. are in many parts subject to frequent earthquakes. Besides the existing active volcanoes of Etna, Vesuvius, and Stromboli, there are many evidences of recent volcanic action, and instances have occurred of islands suddenly upheaved by it, where volcanic fires have appeared for a short time.

MEDIUM, n. *mē'dĭ-ŭm,* ME'DIUMS, n. plu. *-dĭ-ŭmz,* and ME'DIA, n. plu. *-dĭ-ă* [L. *mediŭm,* the middle of a thing]: the middle place or degree between two extremes; means by which anything is accomplished, conveyed, or carried on; the space or substance in which bodies exist, or through which they move in passing from one point to another; in *painting,* the liquid vehicle with which the dry pigments are ground and made ready for the artist's use; in *animal magnetism* and *spiritualism,* the person through whom it is alleged certain spirits manifest themselves and transmit their communications to others. CIRCULATING MEDIUM, the instruments of exchange, as representing value in buying and selling—usually coin, and bank-notes convertible into coin on demand. MEDIUM-SIZED, of a size nearly between the smallest and largest.

MEDIUM (Lat. *medium,* middle): in the phenomena of spiritualism a medium is a person who enters upon a trance-like state in which he or she purports to speak in the personality of some absent person, commonly deceased. The procedure of different mediums varies greatly and no general statements can be made. Some of them lay claim to miraculous control over natural laws, e.g., the law of gravitation. Alleged mediumistic phenomena are often fraudulent. All races and peoples have known examples of the phenomena which have frequently been incorporated in religious practices and beliefs.

MEDJIDIE, *mĕd'jĭ-dĭ* or *mĕj'ĭ-dĭ:* Turkish order, instituted 1852, and conferred after the Crimean campaign on British officers. It has five classes; and the decoration, which differs in size for the different classes, is a silver sun of seven triple rays, with the device of the crescent and star alternating with the rays. The first three classes suspend the badge round the neck, from a red ribbon having green borders, and the fourth and fifth classes wear it attached to a similar ribbon on the left breast.

MEDLAR, n. *mĕd'lėr* [OE. *medle-tree;* OF. *meslier,* the medlar-tree: L. *mespĭlum;* Gr. *mespĭlŏn,* a medlar], (*Mespilus*): genus of trees or shrubs of nat. order *Rosaceæ,* sub-order *Pomeæ,* having a 5-cleft calyx with leafy segments, nearly round petals, a large honey-secreting disk, and 2-5 styles, united together in the flower, but widely separated on the fruit, the upper ends of the bony cells of which are exposed. COMMON MEDLAR (*M. Germanica*), a large shrub or small tree, spiny in a wild state, but destitute of spines in cultivation, is a native of s. Europe and of temperate parts of Asia; and is seen in hedges and thickets in parts of England, though not indigenous there. It has lanceolate leaves, not divided nor serrated, solitary large white flowers at the end of small spurs, and somewhat top-shaped fruit, of the size of a small pear, or larger, according to the variety. The medlar is much cultivated in parts of Europe. It is very austere in taste even when ripe, and is not eaten till *bletted,* when

its tough pulp has become soft and vinous by incipient decay.

MEDLEY, n. *mĕd'lĭ* [OF. *medler,* to mix, to meddle with: F. *mêlée;* mid. L. *melleia,* medley, confusion]: a mixture; a mingled and confused mass of different ingredients; a miscellany. CHANCE-MEDLEY (which see), a mixture made at haphazard.

MEDULLA, n. *mĕ-dŭl'lă* [L. *medulla,* the marrow in the bones]: the fat substance or marrow in the long bones; the pith of a plant. MEDUL'LAR, a. *-lėr,* or MEDULLARY, a. *mĕ-dŭl'lėr-ĭ,* pertaining to marrow or pith. MEDULLA OBLONGATA, *ŏb'lŏng-gā'tă* [L. *oblongus,* long, oblong]: in *anat.,* the continuation of the spinal cord within the skull (see BRAIN). MEDULLA SPINALIS, *spī-nā'lĭs* [L. *spina,* the backbone]: the spinal marrow or cord (see SPINAL CORD). MEDULLARY RAYS, in *bot.,* the rays of cellular tissue seen in a transverse section of exogenous wood, and which connect the pith with the bark (see EXOGEN [*Exogenous Plants*]: PITH). MEDULLARY SHEATH, in *bot.,* a thin layer of vascular tissue which surrounds the pith in exogenous stems. MEDULLARY SUBSTANCE, the interior white portion of the brain.

MEDUL'LARY SARCO'MA: one of the forms of Cancer (q.v.). It grows more quickly, distributes itself more rapidly, and attains greater bulk than any other form of cancer, tumors of this nature being often as large as a man's head, or even larger. Of all forms of cancer, it runs the quickest course, soonest ulcerates, is the most malignant, and causes death in by far the shortest time, often destroying life in a few weeks, or, at furthest, in a few months after its first appearance, unless it has been removed by an operation at an early stage.—When it ulcerates, fungoid growths form upon the surface; they are extremely vascular, and bleed on the slightest provocation. In this state, the disease has received the name of *Fungus hæmatodes.*

MEDUSA, n. *mĕ-dū'să,* MEDUSÆ, n. plu. *mĕ-dū'sē* [L. *Medusa,* in *anc. myth.,* a beautiful woman, having fine hair, which was turned into snakes, one of the three Gorgons (see GORGON)]: sea-animals, usually called sea-blubber, sea-nettles, or jelly-fish, whose usual form is that of a bell, with a gelatinous dome, and a polype hanging in the centre, with trailing feelers around the rim (see ACALEPHÆ; also GENERATIONS, ALTERNATION OF). MEDUSIFORM, a. *mē-dū'sĭ-fawrm* [L. *forma,* shape]: resembling a medusa in shape. MEDUSOID, a. *mĕ-dū'soyd* [Gr. *eidos,* appearance]: like a medusa—used substantively to designate the medusiform gonophores of the hydrozoa; sea-blubbers.

MEDWAY, *mĕd'wā:* river of England, rising near the n. border of the county of Sussex, and, after a n.e. course of more than 50 m., joining the Thames at Sheerness. At Penshurst, 40 m. from its mouth, it becomes

navigable. The chief towns on its banks are Maidstone, Rochester, Chatham, and Sheerness. Large vessels do not ascend above Rochester Bridge; but below that the river widens into an estuary, and forms an important harbor for the British navy.

MEEANEE, or MIYANI: village in Sinde, Hindustan, on the Indus, six m. n. of Hyderabad; celebrated as the scene of a great battle between Sir Charles Napier and the Ameers of Sinde, 1843, Feb. 17. Sir Charles's force, partly of Europeans, partly of natives, amounted to only 2,800 men; that of his foes to 22,000; yet the latter were totally routed, losing in killed and wounded 5,000 men. Sir Charles's loss was only 256. The result of this victory was the conquest and annexation of Sinde.

MEED, n. *mēd* [Goth. *mizdo*, reward, recompense: Ger. *miethe*, hire: comp. Gr. *misthŏs*, pay; Gael. *meud*, degree, extent]: reward; recompense; in *OE.*, merit; desert.

MEEHAN, *mē'an*, THOMAS: American scientist: b. Potter's Bar, near London, England, 1826, Mar. 21; d. Philadelphia, 1901, Nov. 19. From his father, a gardener, he learned facts of natural history when a child; at 8 made and recorded an original discovery in herpetology; taught himself from books read at night after daily tasks; at 12 began to publish scientific papers; soon after produced the first hybrid fuchsia; and was nominated to membership in the Royal Wernerian Society. For two years he held a position at Kew Gardens. In 1848, he came to America and took charge of Bartram's Gardens in Philadelphia. In 1854, he established the Germantown Nurseries, which he conducted until the end of his life. For 30 years (1859-89) he edited the *Gardeners' Monthly*, and contributed papers to many other periodicals and to scientific societies. For 23 years he was senior vice-president of the Philadelphia Academy of Natural Sciences, in whose proceedings were published his important *Contributions to the Life History of Plants*. In 1875, he was elected a fellow of the American Academy for the Advancement of Science, before which, among other noteworthy papers, he read *A Contribution to the Doctrine of Evolution and the Theory of Natural Selection*, which showed him as a co-worker with Darwin and other evolutionary scientists, in whose field he also was a discoverer. From the creation of the office until his death he served as state botanist of Pennsylvania, at one time was a member of the board of visitors of Harvard, and was one of the American editors of the *Encyclopædia Britannica*. His travels and researches extended throughout the country, including Alaska. In 1878, he began the publication of *Native Flowers and Ferns of the United States*, an illustrated serial covering a wide field of floral distribution, the main features of which he continued in *Meehan's Monthly*, founded in 1891. Many learned societies abroad enrolled him, and

he held intimate relations with nearly all the leading scientists of his time. Among his closest friends was the Comte de Paris, a devotee of plant-study. Mechan was the third American to receive the Veitch medal, awarded to him for 'distinguished services in botany and horticulture.' Apart from scientific work he devoted himself to public labors; was a member of the Philadelphia common councils from 1882 until his death; during the same period served on the local school board; in both capacities introduced many reforms; and chiefly through his efforts nearly 30 small parks were added to the city. A work of permanent value is his *American Hand-book of Ornamental Trees* (1853).

MEEK, a. *mēk* [Goth. *muks;* Icel. *miukr;* Dut. *muyck*, soft, mild: Norw. *mykja*, to soften: comp. Gael. *meath;* L. *mitis*, meek]: mild of temper; given to forbearance under injuries; gentle; submissive. MEEK'LY, ad. *-lĭ.* MEEK'NESS, n. *-nĕs*, mildness; gentleness.—SYN. of 'meek': mild; soft; bland; tame; yielding; pacific; unassuming; humble.

MEEK, *mēk*, ALEXANDER BEAUFORT: American jurist: b. Columbia, S. C., 1814, July 17; d. Columbus, Miss., 1865, Nov. 30. He was graduated from the University of Alabama in 1833 and admitted to the bar two years after. He served in the Seminole war 1836; was attorney-general of Alabama 1836; judge of Tuscaloosa county 1842-4; and member of the legislature in 1853. While there he established the free-school system of Alabama. In addition to a legal digest (1842) he wrote: *The Red Eagle* (1855); *Songs and Poems of the South* (1857); *Romantic Passages in Southwestern History* (1857); etc. His best known poem is *The Charge at Balaklava.*

MEEK, FIELDING BRADFORD: American palæontologist: b. Madison, Ind., 1817, Dec. 10; d. Washington, D. C., 1876, Dec. 28. His educational advantages were limited, but his interest in natural history made study imperative to him, and in 1848 he became assistant to David D. Owen in a geological survey of Iowa, Minnesota, and Wisconsin. He assisted James Hall at Albany in 1852-8, spending several summers in a geological survey of Missouri and Nebraska, and in 1858 went to Washington, where he devoted the remainder of his life to palæontologic investigations under the government. He was elected in 1870 to the National Academy of Sciences, and was a member of other scientific organizations. Among his writings are: *Check List of the Invertebrate Fossils of North America* (1864); *Report on Invertebrate Cretaceous and Tertiary Fossils* (1876); etc. For a complete list of his works, see bibliography published by the Smithsonian Institution.

MEEKINS, *mē'kĭnz*, LYNN ROBY, A.M.: American journalist: b. Salem, Md., 1862, Nov. 14. He was graduated from Western Maryland College, Westminster, Md.,

in 1882, and devoted himself to journalism. He was literary editor of the Baltimore *American* 1882-9, when he became managing editor of the Philadelphia *Saturday Evening Post*, and since 1903 has been editor of the Baltimore *Herald*. He has published: *The Robb's Island Wreck* (1894); *Adam Rush* (1902); etc.

MEEKS, EUGENE: American painter: b. New York, 1843. He studied under Wust, at The Hague, and under Van Lerius at Antwerp. In 1883, he received the title of professor from the Academy of Florence, in which city he had made his permanent residence. His Venetian pictures include *Gondola Party* and *Fishing Boats*, and he has successfully handled a *motif* taken from Dickens, in his *Little Nell and Her Grandfather* (1876).

MEER, *mār*, JAN VAN DER: 1632-75; b. at Delft: Dutch painter. In 1653, he married Catherine Bolenes, whom, at his early death, he left with eight children. As an artist his originality was remarkable, in two contrasted styles, at different periods of his life: the earlier that of power, boldness, command of color, and wonderful expression of life, rivalling the style of Rembrandt; the other, belonging to his last 10 or 12 years, characterized by refined delicacy and subtlety, the colors paler and softer, the painting smooth and thin, forming such a contrast with the masculine vigor and brilliant color of the first period as to suggest calling him 'the Protean painter' (Dr. Waagen) and 'the Sphinx of Delft' (W. Bürger, of Thoré, his true name, in *Musées de la Hollande*, 1858-60). Van Meer's pictures were in many cases sold as by Rembrandt, De Hooch, or others; and only in recent years, since Thoré's researches, with Havard's and Obreen's, have his works, which are extremely rare, become properly known—after he had been forgotten for two centuries.

MEERE, or MERE, n. *mēr* [Dut. *meere;* Icel. *mœri*, a boundary: Lap. *mere*, a definite point]: in *OE.*, a boundary; a mark of division. MEERED, a. *mēr'ĕd*, of or relating to a boundary.

MEERSCHAUM, n. *mēr'shŭm* [Ger. sea-foam—from *meer*, the sea; *schaum*, foam]: a mineral forming a silicate of magnesia, manufactured into the bowls of tobacco-pipes; a tobacco-pipe made of the same. This mineral is found in many parts of the world. In Europe it is found chiefly at Hrubschitz in Moravia, and at Sebastopol and Kaffa in the Crimea; and in Asia it occurs abundantly just below the soil in the alluvial beds at Kittisch and Bursa in Natolia; and in the rocks of Eski-Hissar, in the same district, it is mined so extensively as to give employment to nearly a thousand men. Meerschaum, having been found on the sea-shore in some places, in peculiarly rounded snow-white lumps, was ignorantly imagined to be the petrified froth of the sea, which is the meaning of its German name. Its composition is: silica, 60.9;

magnesia, 26.1; water, 12.0. Almost all the meerschaum found is made into tobacco-pipes, in which manufacture the Germans have long been pre-eminent. Vienna contains many manufactories, in which some very artistic productions are made; and pipes worth $500, from the beauty of their designs, are not unknown. The French pipe-makers have lately used meerschaum, and have shown much taste. When first dug from the earth, meerschaum is quite soft and soap-like to the touch; and as it lathers with water and removes grease, it is employed by the Turks as a substitute for soap in washing. The waste in cutting and turning the pipes was formerly thrown away, but it is now reduced to powder, mixed with a paste, and compressed into hard masses, which are carved into inferior pipes. This inferior product is frequently sold for the genuine.

MEES, ARTHUR: American musical director: b. Columbus, Ohio, 1850, Feb. 13. He was graduated from Concordia College, Fort Wayne, Ind., and studied music in Berlin. He has been assistant director, and later director, of some of the leading operas and musical associations, and has published, in addition to his annotated programmes for the New York Philharmonic Society and the Chicago Orchestra, *Chorus and Choral Music.*

MEET, a. *mēt* [AS. *mete;* Icel. *mati,* measure: AS. *gemet,* fit (see METE)]: fit; according to measure; suitable; qualified; proper. MEET'LY, ad. *-lĭ,* in a fit or proper manner; properly. MEET'NESS, n. *-nĕs,* fitness.

MEET, v. *mēt* [Icel. *mot,* against; *mœta,* to meet: Goth. *gamotjan,* to meet: AS. *gemot;* Gael. *mod,* a meeting, an assembly]: to come together; to approach from opposite directions; to come face to face; to come in contact; to encounter unexpectedly; to assemble; to find or light upon; to receive; to suffer unexpectedly, followed by *with:* N. a meeting or assembly of huntsmen. MEET'ING, imp.: N. an interview; an assembly or congregation of people; a joining; a junction; a coming together for the purpose of fighting a duel. MET, pt. or pp. *mĕt.* MEET'ER, n. *-ẽr,* one who meets. QUAKER MEETINGS (see FRIENDS, SOCIETY OF). MEET'ING-HOUSE, formerly in Britain a dissenting place of worship, and still sometimes used in regard to the church buildings of some denominations who prefer to restrict the term Church to its scriptural use for the congregation of the fellowship of faithful Christian people. TO MEET HALF-WAY, to make mutual concessions, as for the amicable settlement of a dispute.—SYN. of 'meeting, n.': assembly; congregation; convention; company; audience; auditory; conference; confluence; union.

MEET'ING: deliberative assemblage of people, with a view to some specified subject or to accomplish some specified purpose. The proceedings may begin with choice of a chairman or presiding officer, and consist in the

proposing and seconding of resolutions, on which the voice or vote of the meeting is taken. The chairman, in addition to his deliberative vote, has often been deemed entitled to give a second or casting vote, thus giving a decision after his previous vote has brought the two opposing sides to an equality. The tendency now is to allow him only one vote, which he is expected to give as decisive in case of an existing tie or equal vote, rather than to create a tie; the usage, however, is not uniform on these points. Any number of persons may in this country or in Britain assemble for any purpose not in itself illegal; but use of force or violence, or any tendency toward it, may entitle the authorities to interfere with a meeting, as an unlawful assemblage. Meetings called, not officially, but by private arrangement, may be deemed a characteristically English and American institution; in most other parts of the world, the right of holding such assemblages is more or less restricted by law.

MEGA, prefix, *mĕg'a* [Gr. *megas,* great; fem. form, *mĕgălē*]: among electricians and on the C. G. S. system multiplication by a million; as employed in any of the natural sciences, great, large; sometimes MEGAL, *mĕg'ăl.*

MEGACEROS, n. *mĕ-găs'ėr-ŏs* [Gr. *megas,* great; *keras.* a horn]: fossil or sub-fossil gigantic deer of Pleistocene marls and peat-bogs; often, but erroneously, termed the 'Irish elk.' The largest were 11 ft. high to the tips of the antlers. The megaceros was regarded as intermediate between the reindeer and the fallow-deer.

MEGADYNE, n. *mĕg'ă-dīn* [prefix *mega-;* Eng. *dyne*]: a force of a million dynes.

MEGAFARAD, n. *mĕg-ă-făr'ăd* [prefix *mega-;* Eng. *farad*]: a million of farads.

MEGALERG, n. *mĕg'al-ėrg* [prefix *megal;* Eng. *erg*]: work amounting to a million ergs.

MEGALESIAN, a. *mĕg'ă-lē'zhĭ-ăn* [L. *megalēsĭŭs*—from Gr. *mĕgălē,* great, a surname of Cybele]: pertaining to games in honor of Cybele, the mother of the gods, in ancient Rome.

MEGALETHOSCOPE, n. *mĕg-al-ĕth'ō-skōp* [Gr. *megas, mĕgălē,* great; *skopeō,* I see]: an improved form of stereoscope invented by Ponti, in which the photograph is considerably magnified and an increased appearance of sphericity obtained. It is so arranged that the object may be viewed by direct or reflected sunlight or by artificial light.

MEGALICHTHYS, n. *mĕg'ă-lĭk'thĭs* [Gr. *mĕgălē,* great; *ichthus,* a fish]: genus of fossil heterocercal ganoid fishes, named from their large size, compared with the other fish of the period. They were covered with large, strong rhomboid scales composed externally of brilliantly polished brown enamel, usually granulated as in the scutes of the recent crocodile. These scales have been

found as large as five inches in diameter. The head was defended by similar strong plates, and the jaws were furnished with immense laniary teeth, of a size rarely attained, even in the largest modern reptiles, and so closely resembling them that they were for some time considered as having belonged to some crocodilean animal. These teeth—specimens of which have been found measuring four inches long and two broad at the base—were smooth at the point, had a long furrowed root and a hollow base, in which the new tooth was prepared. Numerous smaller teeth were scattered over the jaw, among the large ones. The fish of this genus must have been the terror of the seas they inhabited. Their strong skeleton, large tail, powerful head, and ferocious jaws remarkably suited their carnivorous habits.

MEGALITHIC, a. *mĕg'ă-lĭth'ĭk* [Gr. *megas*, great; *lithos*, a stone]: pertaining to a megalith or huge stone, or to a structure of large stones.

MEGALO, prefix, *mĕg-a-lō* [Gr. *megas*, fem. *mĕgălē*, great]: same as MEGA (q.v.).

MEGALOMANIA, n. *mĕg'ă-lō-mā'nĭ-ȧ* [Gr. *megas*, great + mania = madness]: a form of delusion found in general paralysis of the insane and in mania, in which the subject feels himself to have enormous power or influence, to be very much exalted. The mind is filled with fabulous ideas of grandeur. The patient thinks he is a great merchant, plans immense enterprises, has countless wealth. Again he is a literary or artistic genius, a military hero, an emperor, a god; he has accomplished impossible feats, cast churches out of steel, or put a glass case around the asylum, can make himself bigger at will, etc. He never realizes that these extravagant notions are contradicted by everything about him.

MEGALONYX, n. *mĕg'ă-lŏn'ĭks* [Gr. *mĕgălē*, great; *onux*, a nail or claw]: in *geol.*, a huge edentate mammal, found chiefly in the Upper Tertiaries of S. America—so named from the great size of its claw-bones. See MEGATHERIUM.

MEGALOSAURUS, n. *mĕg'ă-lō-saw'rŭs* [Gr. *mĕgălĕ*, great; *sauros*, a lizard]: genus of fossil Dinosaurians, or landsaurians, of gigantic size and carnivorous habits, whose remains occur in the rocks of the Oolite period. The huge body of the animal was supported on four large and strong unguiculate limbs; specimens of the femur and tibia have been found measuring each nearly three ft., giving a total length of almost two yards to the hind leg; and a metatarsal bone 13 inches long shows that the foot had corresponding magnitude. The sacrum was composed of five vertebræ anchylosed together, as in the other Dinosaurs. Buckland calculated that the megalosaurus must have been 60 or 70 ft. long; but it is not likely that a reptile raised so high above the ground would have its body and tail so large in proportion to its limbs,

as in our modern lizards or crocodiles. There seems good reason for accepting Owen's more moderate estimate of 30 ft. as its whole length. A fragment of the lower jaw, containing several teeth in position, tells of its carnivorous habits. Only a single species has been referred to this genus. Its remains are abundant in the Stonesfield slate, in the lower Oolite of Gloucestershire, England, and in the Wealden and Purbeck limestones.

MEGAPHONE, *mĕg'ă-fōn:* invention of Thomas A. Edison, designed to greatly augment the effect of the voice, making conversation possible between persons one or two miles apart, and causing a mere whisper to be heard at the distance of 1,000 ft. To effect this, a pair of large funnels, of paper, are mounted on a stand side by side. These should be 6 ft. 8 in. long, 27½ in. in diam. at the large end, and terminating at the small end in a flexible tube fitted for insertion in the ear. These form the ear-trumpet part, and a smaller funnel fixed between them forms the speaking-trumpet part.

MEGAPHYTUM, n. *mĕg'ă-fī'tŭm* [Gr. *megas*, great; *phuton*, a shoot or plant]: a genus of Coal-measure stems —so called from the large size of their leaf-scars.

MEGAPODE, n. *mĕg'ă-pōd* [Gr. *megas*, great; *poda*, a foot]: the remarkable mound-making bird or brush-turkey of Australia. See JUNGLE-FOWL, of Australia.

MEGAPODIDÆ, *mĕg-ă-pō'dĭ-dē:* family of birds, referred by some naturalists to the order *Grallæ*, but generally to the Gallinaceous order, being regarded as allied to the Curassows, etc. The feet are large and have largo blunt claws. To this order belong the genera *Megapodius* (see JUNGLE-FOWL, of Australia), *Leipoa* (q.v.), *Talegalla* (q.v.), etc. The order is peculiar to New Holland and the neighboring islands.

MEGAPTERA, n. *mĕ-găp'tėr-a* [mod. L.—from prefix *mega;* Gr. *pteron*, a fin]: the hump-backed whale.

MEGARA, *mĕg'a-râ:* city of ancient Greece, 20 m. from Athens, on the road to Corinth, with a district, Megaris, of 143 sq.m., on the isthmus connecting the Peloponnesus with continental Greece. The origin of its trade was Phœnician, and it was in early times one of the most important Greek commercial and colonizing centres. Its position gave it political importance, and B.C. 850-650 it was one of the most powerful cities of Greece, with numerous colonies, of which Byzantium and Chalcedon, on the Bosphorus, were chief. The education of the poorer classes created democratic socialism, and enabled Theagenes to become a popular tyrant, until expelled by the nobles, about B.C. 600. The strife of rich and poor which followed is pictured by a poet of Megara, Theognis. Athens meanwhile became strong, and made successful war on Megara for the island of Salamis, close at hand. In the Greek wars which came later, Megara suffered terribly from ravage and famine. A

notable distinction of Megara is its school of philosophy, known as the Megaric school, founded by Euclid (q.v.), disciple of Socrates.

MEGARIANS: a Socratic school of philosophic thought founded by Euclid of Megara. To the school belonged Alexinus, Diodorus Cronus, Eubilides and Stilpo. Among other doctrines they held that the good is synonymous with being. See EUCLID, of Megara.

MEGARIS, *mĕg'a-rĭs:* small mountainous region of Hellas or Greece proper, bounded by Attica, Corinth, and the sea. It formed the northeastern part of the Isthmus of Corinth. The capital was MEGARA (q.v.), famous among the ancients for its white shell marble, and for a white kind of clay, of which pottery was made.

MEGASS', or MEGASSE'. See BAGASSE; BEGASS.

MEGASTHENES, n. *mĕg'as-thēnz,* or MEGASTHENA, n. *mĕ-găs'thĕn-a* [mod. L.—from prefix *mega-;* Gr. *sthenos,* strength]: in *zool.,* in the classifications of James D. Dana, the second order of mammals. His arrangement of the Mammalia was: (1) Archontia (or Dipoda), containing man alone; (2) Megasthena, containing Quadrumana, Carnivora, Herbivora, and Mutilata; (3) Microsthena, containing Cheiroptera, Insectivora, Rodentia, and Edentata; (4) Oöticoidea, including Marsupialia and Monotrema. See MAMMALIA; ZOOLOGY.

MEGATHERIUM, n. *mĕg'ă-thē'rĭ-ŭm* [Gr. *megas,* great; *thērĭŏn,* a wild beast]: gigantic extinct quadruped of order Edentata, nearly allied to the sloth, found in the superficial stratum of the South American pampas. In structure, it is very near its modern representative, except that the whole skeleton is modified to suit the requirements of an immense heavy-boned and heavy-bodied animal, probably 18 ft. in length and 8 ft. in height. The appellation tardigrade, which Cuvier applied to the sloth, cannot be given to the Megatherium; its limbs were comparatively short and very strong, and the feet adapted for walking on the ground, approaching in this respect nearer to the allied ant-eaters, but with this peculiarity, that the first toe of each of the hind feet was furnished with a large and powerful claw, used probably as a digger, to loosen roots from the soil and enable the creature more easily to overturn the trees on whose foliage it browsed. The enormous development of the bones of the pelvis, the hind legs, and the tail, gave the animal great power when, seated on its hind legs and tail, as on a tripod, it raised its fore legs against the trunk, and applied its force against a tree already weakened by having its roots dug up. The structure of the lower jaw indicates that the megatherium may have been furnished with a huge prehensile tongue like that of the giraffe, with which it stripped the foliage from the trees.

The remains of several allied genera of huge Edentata are associated with the megatherium in the pampas de-

posits. They form the family MEGATHERIDÆ of Owen, which includes Mylodon, Megalonyx, Scelidotherium, etc. —nine or more genera separated from megatherium chiefly by peculiarities in the dentition.

The modern sloth is a native of South America, and the fossil remains of these immense creatures, which represented the sloth in the newer Tertiaries, have been found only in this continent, the past and present distribution of the family being the same.

MEGATHERMS, n. plu. *mĕg'ă-thėrmz* [Gr. *megas*, great; *thermē*, heat]: plants requiring a high temperature; also called *macrotherms*.

ME'GERLE, ULRICH. See ABRAHAM-A-SANCTA-CLARA.

MEGILP, n. *mē-gĭlp*, or MEGILPH, n. *mē-gĭlf'* [unascertained]: a compound of linseed-oil and mastic varnish, etc., used by artists as a vehicle for their colors; also spelled MAGILP.

MEGISTOTHERMS, n. plu. *mĕ-gĭs'tō-thėrmz* [Gr. *megistos*, very great; *thermē*, heat]: plants requiring extreme or a very high degree of heat.

MEGOHM, n. *mĕg'ōm* [Gr. *megas*, great, and Professor *Ohm*]: a measure of electrical resistance; one million ohms. See OHM.

MEGRIM, n. *mē'grĭm* [Gr. *migraine*, megrim: Gr. *hemĭkrānĭă*—from *hemi*, half; *kranĭŏn*, the skull]: popular term for neuralgia occupying one-half of the head, usually only the brow and forehead of one side. It is often periodical, coming on at a certain hour, lasting a certain time, and then entirely disappearing for a fixed interval. It may be induced by any cause that debilitates the system; it not unfrequently attacks women who have suckled their children too long; or it may be associated with hysteria; or it may be excited by the malarial poison; or it may be due to eyestrain; or it may be associated with dyspepsia, especially intestinal indigestion and its resultant auto-intoxication; and sometimes no exciting cause can be detected.—When associated with anæmia (paleness and general debility), it should be treated with the preparations of iron, the shower-bath, nourishing food, and plenty of exercise in the open air. When it is strictly periodical, quinine in full doses has been commended (the bowels being previously well cleared); and if the quinine fails, Fowler's solution of arsenic, under order of a physician, given in small doses (three minims in a wine-glassful of water), three times a day, after meals, may be tried. In every case of periodical headache which has misled other measures, the sufferer's eyes should be examined, and if any visual defect exists it should be corrected by properly fitted glasses.

ME'GRIMS AND VER'TIGO: terms usually applied to the condition of a horse which at work reels, and then either stands for a minute dull and stupid, or falls to the

ground, lying for a time partially insensible. These attacks come on suddenly, are often periodical, are most frequent during hot weather and when the animal is drawing up a hill or exposed during heavy work to the full rays of a hot sun. Liability to megrims constitutes unsoundness, and usually depends on the circulation through the brain being temporarily disturbed by the presence of tumors. Horses subject to megrims are always dangerous. If driven at all, they should be used with a breastplate or pipe-collar, so as to prevent, as much as possible, pressure on the veins carrying the blood from the head; they should be moderately and carefully fed, and during hot weather have an occasional laxative.

MEHEMED ALI, *mā'hėm-ĕd â'lē*, or MEHEMET ALI, *mā-hėm-ĕt*, also MOHAMMED ALI, *mō-hăm'ĕd*, Viceroy of Egypt: 1769—1849, Aug. 2 (viceroy 1806-48); b. at Kavala, a little town in Macedonia. He entered the Turkish army at an early age; and 1799 was sent to Egypt at the head of a contingent of 300 troops, to cooperate with the British against the French invaders. Here his fine military qualities rapidly developed, and he at length became commander of the Albanian *corps d'armée* in Egypt. In 1806 he was recognized by the Porte as Viceroy of Egypt and Pasha of Three Tails; but was soon involved in disputes with the Mamelukes, who had long practically ruled Egypt. He terminated the struggle 1811, by the massacre of the greater number of these at Cairo. The rest fled to Upper Egypt, but were expelled by Mehemed in the following year. They then took refuge in Nubia from their remorseless foe; but in 1820 he followed them thither, and they were utterly exterminated.

The Porte, in alarm at his growing power and with a view to break it, intrusted him with command of an expedition against the Wahabis (q.v.), a religious sect of Arabia. But the victories of his son, Ibrahim Pasha (q.v.), only rendered Mehemed more powerful, and his authority extended over a great part of the Arabian peninsula. Shortly afterward he conquered Kordofan, added it to his dominions, and opened a great trade in black slaves from interior Africa. About this time he began to reorganize his army on something like European principles, built a fleet, and erected fortresses, military workshops, and arsenals. His ambition, however, received a severe check by the total destruction of his new navy at Navarino 1827. In 1830 the Porte conferred on him the government of Candia, but this did not satisfy him; and in the following year, on a frivolous pretext, he sent out an army for conquest of Syria, under Ibrahim Pasha, who, by his victory at Konieh 1832, Dec. 20, brought the Turkish government to the brink of ruin. The European powers interfered, and a treaty was concluded 1833, May 4, by which Syria was ceded to Me-

hemed, on condition of his acknowledging himself a vassal of the sultan. Neither of the belligerents was satisfied, and Mehemed continued to plot in his usual crafty style, till Sultan Mahmud was obliged 1839 to declare war against his dangerous subject. The European powers again interfered, and Mehemed saw himself compelled to give up all his claims to the possession of Syria, and to content himself with getting the pashalic of Egypt made hereditary in his family. If the infirmities of age had not begun to tell upon Mehemed, he might have re-established Egyptian nationality. He thoroughly cleared the country of robbers, from Abyssinia to the mouths of the Nile; he may almost be said to have introduced the cultivation of cotton, indigo, and sugar into the country. While Syria was under his rule, he increased to an immense extent the mulberry plantations, and consequently the cultivation of silk; and to crown all his efforts, he established in Egypt a system of national education. In his last years, he fell into a sort of religious dotage; and at last, 1848, resigned his viceroyship in favor of his son, Ibrahim Pasha (q.v.).

MEIGGS, *mĕgz*, Henry: American contractor: b. Catskill, N. Y., 1811, July 7; d. Lima, Peru, 1877, Sept. He was engaged in the lumber business in New York and other places but met with financial reverses and in 1848 went to California, where he again took to the lumber business and gained an immense fortune. Reverses, however, once more swept away his wealth, leaving him with an indebtedness of more than $1,000,000. He fled with his family to Peru, where he soon embarked upon a series of bridge and railway building enterprises, which won for him immense wealth and a world-wide fame as a railway contractor. His engineering achievements in South America comprise some of the most daring feats in the history of the profession. The construction of the Callao, Lima, and Oroya road, which crosses the Andes and ascends to a height only 136 feet lower than the summit of Mount Blanc, was his crowning achievement, and was practically completed at his death. He paid in full the enormous obligations incurred by his failure in San Francisco, contributed generously to charities in the United States and Peru, and by the laying out of a beautiful park, which he presented to the city of Lima, materially changed for the better the appearance of the city.

MEIGS, Montgomery: American civil engineer: b. Detroit, Mich., 1847, Feb. 27. He was educated at Harvard and in Germany, and was for several years in the employ of the Northern Pacific railroad. Since 1882 he has had charge of the Des Moines Rapids Canal under the government. He is the inventor of a 'canvas cofferdam.' He also constructed the United States dry dock at Keokuk.

MEIGS, *mĕgz*, MONTGOMERY CUNNINGHAM: 1816, May 3—1892, Jan. 2; b. Augusta, Ga. He graduated at the U. S. Milit. Acad. 1836; entered the artil. branch of the army, but was transferred to the engineers 1837; was promoted 1st lieut. 1838, capt. 1853, col. 11th U. S. inf. 1861, May 14, and quartermaster-gen. and brig.gen. U. S. A. on the following day; and was retired 1882, Feb. 6. During 1836–41 he was employed chiefly in the building of Fort Delaware, and in the improvement of Delaware bay and river; 1841–49 was superintending engineer on the construction of Forts Wayne, Porter, Niagara, and Ontario; 1849–50 was in the engineers' bureau, Washington; 1850–52 superintended the construction of Fort Montgomery, N. Y.; and 1852–60 planned and constructed the Washington aqueduct, the new wings and iron dome of the national capitol, the extension of the post-office, and the completion of Fort Madison, Md. In 1860, Nov., he was ordered to Fla., to strengthen Forts Jefferson and Taylor, and 1861, Apr., was appointed chief engineer of the expedition to relieve Fort Pickens, Fla., then besieged by the Confederates. As quartermaster-gen. of the army, he had charge of the equipment and supply of all the great Union armies in the field during the civil war; was present at Bull Run 1861, July, and at the investment, bombardment, and battle at Chattanooga; was brevetted maj.gen., for services during the threatened invasion of Washington 1864, July; supplied and refitted Gen. Sherman's army at Savannah 1865, Jan.; and from the close of the war till his retirement was on inspection duty in Tex., Cal., Dak., Wyo., Ariz., and in various European cities. He was architect of the new pension building in Washington after his retirement, and was a regent of the SmithsonianInstitution, and member of the National Acad. of Sciences.

MEIGS, RETURN JONATHAN: soldier: 1734, Dec. 17—1823, Jan. 28; b. Middletown, Conn. He brought an infantry company to the Amer. camp after the battle of Lexington, and served under Benedict Arnold, as major, in the expedition to Canada. He was captured at Quebec, but exchanged the next year, and then raised a regt., of which he was made col. 1777. 1777, May, he led 170 men against the Brit. force at Sag Harbor, L. I., and destroyed 12 vessels and made 90 prisoners—a success for which cong. voted him thanks and a sword. In Wayne's storming of Stony Point he led a regt. and gained honorable mention from Washington. He served through the war, and in 1788 was among the first settlers of O. From 1801 to his death he was in charge of the Cherokee agency, Ga. His journal of the Canada expedition is especially valuable.

MEIGS, RETURN JONATHAN: statesman: 1765, Nov.—1825, Mar. 29; b. Middletown, Conn. He was a graduate of Yale 1785, studied law and went to Ohio 1788, settled at Marietta, was commissioner from Gen. St. Clair to Detroit 1790, took part in Indian wars, was

chief-justice of the O. supreme court 1803–4, had military charge of the St. Charles district of La. 1804–06, and was supreme judge 1805–6; was judge of the U. S. dist. court of Mich. 1807–8; U. S. senator 1809, Jan. 6—1810, May 1; gov. of O. 1810–14; rendered important services in the war of 1812–15; was postmaster-gen. under Madison and Monroe 1814, Mar.—1823, Dec., and then lived in retirement at Marietta until his death.

MEINAM, *mā-e-nâm′* or *mā-nâm′:* the great river of Siam (q.v.).

MEINE, v. *mēn* [AS. *mengan*, to mix]: in *OE.*, to mix. MEINED, MEYNT, or MEINT, pp. mingled; mixed.

MEINE, or MEINY, n. *mē′nĭ* or *mī′nĭ* [OF. *mesnie*, a family or household, servants: OF. *maisné* or *mainsné*, younger child—from L. *minus natus* for *minor natu*, less by birth, a younger child]: in *OE.*, family; domestic servants; retinue: see MENIAL.

MEININGEN, *mī′nĭng-ėn:* capital of the duchy of Saxe-Meiningen-Hildburghausen; town in a narrow valley, on the banks of the Werra. The ducal castle, built 1681, contains a fine library and several art collections. There is a fine 'English garden' here. M. has little trade. Pop. (1880) 11,227; (1885) 11,448; (1900) 14,518.

MEIOCENE: see MIOCENE.

MEIOPHYLLY, n. *mī-ŏf′il-lĭ* [Gr. *meiōsis*, decrease; *phullon*, a leaf]: in *bot.*, the suppression of one or more leaves in a whorl.

MEIOSIS, n. *mī-ō′sĭs* [Gr. *meiōsis*, decrease]: a rhetorical figure, a species of hyperbole, representing a thing less than it is.

MEIOSTEMONOUS, a., or MIOSTEMONOUS, a. *mī′ō-stĕm′ō-nŭs* [Gr. *meiōn*, less; *stemon*, a stamen]: in *bot.*, a term applied to stamens less in number than the parts of the corolla.

MEIOTAXY, n. *mī′ŏ-tăks-ĭ* [Gr. *meiōn*, less; *taxis*, arrangement]: in *bot.*, the complete suppression in a plant of a set of organs, as the corolla or the stamens.

MEISSEN, *mīs′sėn:* one of the oldest towns in the kingdom of Saxony; on the left bank of the Elbe, 15 m. below Dresden. Its chief building is the cathedral, finest Gothic church in Saxony, surmounted by an exquisite spire of open-work, and containing many monuments of very early times. There are here a number of brasses, some of them finer than any in England or Flanders. M. was founded 928 by Henry I. of Germany, as a bulwark of his German territories against the Slavonians, and was long the cap. of the markgrafdom of M. which was subsequently merged in the duchy of Saxony. Otto I. founded the cathedral. It was burned down at the beginning of the 13th c.; rebuilt 1266–93; since which time it has been twice destroyed by fire and restored. The castle, on a precipitous rock, was rebuilt 1471, and 1710 was converted into a porcelain factory,

but has recently been restored to more dignified uses. Other manufactures are iron, machinery, pottery, and ivory carving. The commune of Cölln was united on 1901, Jan. 1. Pop. (1885) 15,474; (1900) 31,434.

MEISSONIER, *mā-so-ne-ā′*, JEAN LOUIS ERNEST: French painter: 1813, Feb. 21—1891, Jan. 31; b. Lyons; pupil of Léon Cogniet, in Paris, and very early produced works, as *Le Petit Hallbardier*, which his later fame has made valuable. He first exhibited, 1834, *Les Bourgeois Flamands*, but was earliest revealed by his *Le Petit Messager*, 1836, marked by extreme delicacy of execution and rare thoughtfulness. Until 1840 his work was modelled on the great Dutch painters, and 1840–50 there was still something youthful in his work, as, e.g., in *The Violoncello Player*. But soon after 1850 the talent of M. was mature, and he rose to the height of dramatic and historical painting. His *Les Bravos* gave an unsurpassable rendering of human villainy. In 1855 Prince Albert carried home to England, from the Exposition at Paris, M.'s *La Rixe*, a gift to the prince from Napoleon III. In it were displayed qualities which M. has never surpassed, though he has since immensely extended his field of vision, and has become a marvellous painter of light. M. is peculiar in his power to give character to single figures, or to groups, in repose or in violent action. His work shows great variety, is intellectual and intensely truthful, and is executed slowly. Three of the greatest of his pictures refer to Napoleon's campaigns—1805, or *Les Cuirassiers*, 1807, or *Friedland*, and 1814, or *Retraite de Russie*. Hardly below these is the *Napoleon III. at Solferino*. A small *Napoleon* which Mr. Ruskin bought about 1864 for £1,000 he sold 1882 for £6,000. In 1861 M. was elected a member of the Acad. of Fine Arts. He had obtained a third-class medal 1840, second-class 1841, and first-class 1843 and 48. In 1846 he was created a Kt. of the Legion of Honor, 1856 an officer, 1867 commander. At the Paris Exposition, 1885, he was given one of the grand medals of honor. In the year previous, a collection of about two-thirds of his pictures, which number in all about 200, was exhibited in Paris, shortly after the incident of the portrait of Mrs. Mackay, which that lady threw upon the fire. Several of the finest examples of M.'s work are in Amer. galleries.

MEISTERSINGERS, n. *mīs′tėr-* [Ger., master-singers]: successors of the MINNESINGERS (q.v.).

MEITH, or MEATH, n. *mēth*: a boundary; a mark; a sign; a landmark.

MEK′HITAR, or MECH′ITAR: see MECHITARISTS.

MEKHONG, *mā-kŏng′*, or MEIKHONG, *mā-e-kŏng′*, or MAKIANG, *mâ-kē-âng′*, or CAMBODIA, *kăm-bō′dĭ-a*: great river of Cochin-China (q.v.).

MEKLONG, *mā-klŏng′*: town of Siam, at the confluence of the Meklong river with the w. mouth of the Menam, 30 m. s.w. of Bangkok. The province furnishes salt for all the kingdom. Pop. of M. estimated 10,000.

MELA, *mē'la*, POMPONIUS: Latin writer—the first who composed a strictly geographical work; b. Tingentera, in southern Spain; believed to have lived in the time of the Emperor Claudius, but nothing whatever is known concerning him. Mela's little compendium, whose date was probably A.D. 43, is in three books, and is entitled *De Situ Orbis*. The text is greatly corrupted, on account of the abundance of proper names. There is lack of system, but the author shows a creditable research and discrimination in the use of authorities. The *editio princeps* appeared at Milan 1471; there are editions by Tschucke (1807), Weichert (1816), Parthey (1867). Mela was translated into English as long ago as 1585.

MELACONITE, n. *měl-ăk'ŏn-īt*, or MELAC'ONIZE, n. *-ŏn-īz* [Gr. *melan*, black; *konis*, powder]: an impure black oxide of copper, occurring in veins in powdery masses, arising probably from the decomposition of other ores.

MELADA, n. *měl'a-da* [Sp. pp. of *melar*, to candy—from L. *mel*, honey]: crude or impure sugar, as it comes from the pans, consisting of a mixture of sugar and molasses.

MELÆNA, n. *měl-ē'nă* [Gr. *melan*, black]: in *med.*, the discharge of black blood from the bowels.

MELAIN, n. *měl'ā-ĭn* [Gr. *melaina*, blackness]: black substance, resembling in character the black pigment of the eye, obtained from the so-called ink of the cuttle-fish. It is insoluble in water, alcohol, ether, and the alkaline carbonates, but dissolves in nitric and sulphuric acids.

MELAINOTYPE. See MELANOTYPE.

MELALEU'CA. See CAJUPUT.

MELAMPODE, n. *měl'ăm-pŏd* [L. *melampo'dĭum*—from Gr. *melas*, black; *pous* or *poda*, a foot]: in *OE.*, black hellebore.

MELANCHO'LIA: disease involving exaggeration of the natural and legitimate feelings of grief, despondency, and apprehension, which become morbid where the emotion is without a cause, disproportioned to the actual cause, or so intense as to disturb and destroy the exercise of the other mental powers. This dejection and suffering are found associated with exalted sensations, or delusions as to the personal or physical condition of the individual, which originate in habitually cherishing certain impressions, in fixing the attention upon certain vital processes, which may be unhealthful, or which may become so by the very concentration of thought upon them. The patient lives in fear of death; in the conviction that he is differently or more exquisitely constructed than those around; that he labors under some foul or fatal disease; that he is destitute of strength or comeliness. This affection prevails at maturity—at the period

of greatest activity and usefulness. Toward the decline of life—though encountered at every age—morbid depression often assumes the form of religious anxiety, despair, remorse. Defective nutrition, or anæmia, appears to be the physical state with which the great majority of cases of melancholia are connected, and to which all modes of treatment are directed. The aspect of the melancholiac corroborates the view of inanition and exhaustion as its cause. The surface is pale, dry, cold, attenuated, even insensible; the muscles are rigid; the frame is bent; the eyes sunk, and fixed or flickering; the lips parched and colorless. There is a sense of exhaustion or pain or impending dissolution. It has been remarked, that in proportion to the intensity of the internal agony is there an obtuseness or anæsthesia to wounds or external injuries. Such an immunity gives in lunatics an indifference to the most grievous forms of bodily suffering, and may explain certain attempts at suicide when most painful means have been taken to destroy life.

MELANCHOLY, n. *mĕl'ăn-kŏl-ĭ* [L. *melanchŏlĭă*—from Gr. *melangchŏlĭa*, black bile—from *melan*, black; *cholē*, bile: Sp. *melancolia:* F. *mélancolie*]: dejection or depression of spirits; a gloomy state of mind: ADJ. dismal; dejected; calamitous; low-spirited; mournful. MEL'ANCHOL'IC, a. *-kŏl'ĭk*, depressed; dejected. MEL'ANCHO'LIA, n. *-kō'lĭ-ă*, a variety of insanity (see above).—SYN. of 'melancholy, a.': sad; dispirited; melancholic; gloomy; fanciful; unhappy; disconsolate; afflictive; hypochondriac or hypochondriacal; heavy; doleful; sombre; unfortunate.

MELANCHTHON, *mė-lăngk'thon*, Ger. *mā-lânċh'tōn*, PHILIP: Luther's fellow-laborer in the Reformation: 1497, Feb. 16—1560, Apr. 19; by Bretten, in the Palatinate of the Rhine, now in the grand duchy of Baden. His name was originally Schwarzerd (black earth), of which Melanchthon is a Greek translation. He was educated at the University of Heidelberg, where he took the degree of bachelor of philosophy 1512. In the same year he went to Tübingen, studied theology, took the degree of master, and 1514 gave lectures on the Aristotelian philosophy and the classics. About this time, he published a Greek grammar. On his relative Reuchlin's recommendation, he was appointed, 1518, professor of the Greek language and literature in Wittenberg. He soon decided in favor of the Reformation, and brought to the aid of Luther great attainments in learning, great acuteness in dialectics and exegesis, remarkable power both of clear thinking and of clearly expressing his thoughts, and, with all, a gentleness and moderation that most advantageously tempered Luther's vehemence. In 1521 he published his *Loci Communes Rerum Theologicarum*, the first great Protestant work on dogmatic theology. It passed through more than 50 editions during the author's life. In 1530 he made a most important

contribution to the cause of Protestantism in the Augsburg Confession (q.v.). In 1541 he went to Worms, and soon afterward to Ratisbon, to conduct the cause of the Protestants in the conferences there. But the influence of the papal legate counteracted all his efforts for a peaceful accommodation, and his own party were much dissatisfied on account of the concessions which he made. After Luther's death, Melanchthon lost in some measure the confidence of some of the Protestants, by those concessions to the Roman Catholics which his anxiety for peace led him to make; while the zealous Lutherans were no less displeased because of his approximation to the doctrine of Calvin on the Lord's Supper. Melanchthon was always greatly under Luther's influence, yet from time to time he developed modifications of Luther's doctrine; and indeed his own views, though always clearly evangelical, passed through varying philosophical phases. His consent, conditionally given, to the introduction of the Augsburg Interim (q.v.) in Saxony, 1549, led to painful disputes within the Protestant ranks; and he was involved in various controversies, which filled the latter years of his life with disquietude. He died at Wittenberg. Melanchthon, though gentle, was emotional and excitable. He was conciliatory in the extreme. As a public teacher, he was exceedingly admired, and students flocked to him from all parts of Europe. He was essentially a theologian and scholar, and in his habits, if not in his opinions, was the precursor of those acute and laborious divines who have in modern times shed so much lustre on the German Church. The most complete edition of his works (which comprise a Greek and Latin Grammar, editions of and commentaries on several classics and the Septuagint, biblical commentaries, doctrinal and ethical works, official documents, declarations, dissertations, responses, and a very extensive correspondence with friends and the leading men of the age) is that by Bretschneider in *Corpus Reformatorum* (28 vols. 1834-60). Melanchthon's life has been written by his friend Camerarius (1566), and frequently since—e.g., by Matthes, Nitzsch, and Schmidt.

MELANCHTHONIAN, n. *mĕl-ăngk-thō'nĭ-an:* a follower of Melanchthon, in his use of the Aristotelian philosophy.

MELANESIA, *mĕl-a-nē'shĭ-a:* division of the South Sea Islands inhabited by the Papuan race: see POLYNESIA.

MÉLANGE, n. *mā-lăngzh'* [F.]: a mixture; a medley.

MELANIN, n. *mĕl'ă-nĭn* [Gr. *melan,* black]: the black pigment found in the eye; also in the skin, hair, and other parts, especially of the negro.

MEL'ANISM: an excess of pigment in the skin and its appendages, producing real or comparative blackness; the opposite of albinism (q.v.). Melanism is less fre-

quent than albinism, but more inclined to affect large numbers of individuals of a species, forming melanistic varieties. A conspicuous example is afforded by the American 'black' squirrels, which are melanistic varieties of various species, especially the fox-squirrel (*Sciurus niger*) and the gray squirrel (*S. carolinensis*). These varieties prevail in certain parts of the country, as the region of the Great Lakes and upper Mississippi valley, and rarely occur elsewhere. Thus a black squirrel is almost unknown in New England or the Hudson valley. Another familiar example is found in the black leopards, which in a direct light seem absolutely black, but under reflected light betray a pattern of spots similar to those of the ordinary leopard. Such examples, as is the case with other melanistic animals, often occur in the same litter of young with normal forms. In many of the lower animals, as butterflies, melanistic tendencies are developed under certain conditions, especially of excessive moisture. The dark color of the negroid human races is of this nature, and is greatest in those inhabiting warm moist regions. The pigments in the skin are mainly of the class called melanins, which produce dark hues. Total abnormal melanism in man is unknown, but cases of partial melanism are on record. In one instance one-half of the face was white, the other black. The cause of this condition is unknown. Melanoderma, chloasma, and liver-spots are terms applied to irregularly shaped yellow, brown, and black colorations of the skin. Some of these spots are due to scratching following the bites of body-vermin, to prolonged pressure upon a portion of the skin, prolonged use internally of preparations of silver, to racial admixture, general diseases, such as cancer or tuberculosis, etc.

MELANITE, n. *mĕl'ăn-īt* [Gr. *melan*, black]: a variety of garnet of a grayish-black color. MELANITIC, a. *mĕl'-ăn-ĭt'ĭk*, pertaining to melanite.

MELANO, or MELAN, prefix [Gr. *melanos*]: black.

MELANOCHROITE, n. *mĕl'ăn-ŏk'rō-īt* [Gr. *melan*, black; *chrŏă*, color]: a mineral, chromate of lead, occurring in rhombic prisms, and massive, of a deep hyacinth red.

MELANOCOMOUS, a. *mĕl-a-nōk'o-mŭs* [Gr. *melanos*, black; *komē*, hair]: black-haired; having very dark or black hair.

MELANOPATHY, n. *-ŏp'a-thĭ:* a disease of the skin, consisting in the augmentation of black pigment, generally in patches.

MELANORRHŒA, *mĕl'an-o-rē'a:* genus of trees of natural order *Anacardiaceæ*.—To this genus belongs the BLACK VARNISH TREE (*M. usitata*) of Burmah and northeastern India, called *Theet-tsee* or *Zitsi* in Burmah, and *Khew* in Munipoor. It is a very large tree, attaining a height of 100 ft., with large, leathery, simple, entire,

deciduous leaves, and axillary panicles of flowers. It yields a viscid rust-colored juice, which becomes black on exposure to the atmosphere, and is excessively acrid, causing swellings with much pain and fever if it touches the skin. It is valued as a varnish for painting boats, and vessels intended to contain liquids; also as a size-glue in gilding. Is a considerable article of trade in India and Burmah.

MELANOSIS, n. *mĕl'ăn-ō'sĭs* [Gr. *melas* or *melan*, black]: in *med.*, a disease characterized by a deposit of black or blackish-brown matter, occurring in various forms in different parts of the body. MEL'ANOT'IC, a. *-ŏt'ĭk*, pertaining to or having the character of melanosis. For *Melanotic Cancer* or *Melanic Cancer* (Melanosis), see CANCER.

MELANOTYPE, n. *mĕ-lăn'o-tīp* [prefix *melano;* Eng. *type*]: in *photog.*, a process which takes its name from the black ground of varnished sheet-iron supporting the collodion which receives the picture.

MELANOUS, a. *mĕl'a-nŭs* [Gr. *melan*, stem of *melas*, black]: word introduced by Dr. Pritchard as an equivalent for 'brunette.'

MELANTERITE, n. *mĕl-ăn'tėr-īt* [Gr. *melan*, black]: the mineralogical term for the native sulphate of iron.

MELANTHACEÆ, *mĕl-ăn-thā'sē-ē:* natural order of endogenous plants; containing bulbous, tuberous, and fibrous-rooted plants, with or without stems, and having parallel-veined leaves which are sheathing at the base. The fruit is a capsule, generally divisible into three pieces.—There are about 130 known species, natives of all parts of the world, but most abundant in northern countries. Some resemble crocuses, and some are like small lilies. The order is characterized by great prevalence of poisonous qualities. Some of the species are used in medicine, particularly Colchicum (q.v.), White Hellebore (*Veratrum album:* see HELLEBORE), and SABADILLA (q.v.). The root of *Helonias dioica* is used in North America as an anthelmintic and tonic bitter. The plant grows in wet places, and is called *Starwort* and *Blazing Star*, also *Unicorn's Horn* and *Devil's Bit.*

MÉLANURE, n. *mā'lăn-ūr* [F. *mélanure*—from Gr. *melan*, black; *oura*, a tail]: a small fish of the Mediterranean.

MELANURUS. See MÉLANURE.

MELA-ROSA, *mĕl'ā-rō'za:* fruit of the genus *Citrus*, and probably a variety of the Lime (q.v.); cultivated in Italy. It receives its name from its fragrance being thought to resemble that of the rose. It is a small flattened fruit, with a protuberance at the tip, from which many raised ribs proceed in star-like form to the circumference. The skin is yellow, thin, and adheres closely to the pulp.

MELASMA, n. *měl-ăz'mă* [Gr. *melasma*, a black spot]: a blackening or darkening; in *med.*, a black spot on the lower extremities, especially of old people.

MELASTOMACEÆ, *měl-ăs-to-mā'sē-ē:* natural order of exogenous plants, containing about 1,200 known species; trees, shrubs, and herbaceous plants, natives mostly of warm climates, though a few are found in temperate parts of North America. They have opposite undivided leaves, destitute of dots. The flowers are regular.—None of the melastomaceæ possess poisonous properties; some are used in dyeing; the gratefully acid leaves of some are cooked and eaten—particularly those of species of *Medinilla* and *Astronia papetaria* in the Malay archipelago; some yield eatable and pleasant fruits, as *Blakea triplinervis* in Guiana, *Clidemia hirta* in the West Indies, and *Memecylon edule* in Coromandel. The wood of some is tough and hard.

MELAZ'ZO. See Milazzo.

MEL'BA, Nellie: Australian prima donna: b. Melbourne, 1865, May 19. She studied there in the Presbyterian Ladies' College; then took up music under Marchesi in Paris. On Oct. 15, 1887, she made her début in Brussels in 'Rigoletto'; at that time gave up her family name Mitchell and took the stage name Melba, which is said to have been suggested by the name of her native city; in 1889 appeared in Paris at the Opera, where she stayed for three years, during which she appeared in London in Italian répertoire; and after 1892 toured Europe and America. Her best roles are Ophelia, Juliette, Lucia and Nedda in *I' Pagliacci.*

MELBOURNE, *Měl'bern:* city, capital of the original state of Victoria, Australia; situated chiefly on the northern bank of the Yarra-Yarra, about 9 m. by water and 2 m. by land above its mouth, in the spacious bay of Port Phillip; lat. 37° 48′ s., long. 144° 58′ e. Its streets are straight, regular, and wide; and are paved, macadamized, and plentifully supplied with gas and fresh water. Collins street, one of the leading thoroughfares, is one-third wider than Broadway, New York. Melbourne is built of brick and stone, and contains many fine churches. Perhaps nothing gives stronger testimony to the wealth and enterprise of the inhabitants of Melbourne than the rapidity with which so many noble institutions as adorn the city have sprung up. Among these, one of the chief is the university, with annual endowment from the stae of £9,000, and possessing valuable scholarships and exhibitions. It is a large building, in the shape of a parallelogram, and is surrounded by extensive grounds. It was opened 1855, Apr., and has a considerable attendance of students in arts, law, engineering, etc. The post-office, a magnificent structure, in Italian style, elaborately ornamented with sculpture, was built 1859. The Yan-Yean waterworks, by which

water is conveyed by iron pipes from a distance of 18 m., were opened 1857. The Parliament Houses were erected 1855, at a cost of £400,000. The buildings for the Exhibition of 1880 cost about £70,000. Besides those mentioned, the chief institutions are the Melbourne Hospital, the Benevolent Asylum, the Immigrants' Home, the Servants' Home, the Orphan Asylums, the Lying-in Hospital, Treasury, County and City Courts, Public Library, Custom-house, Barracks, Picture Gallery, the numerous richly ornamented banks, the Grammar-school, Scotch College, besides many other educational establishments and numerous literary and scientific institutions and societies. There are three daily newspapers, two evening journals, and several weeklies and monthlies. The ecclesiastical buildings include an Anglican Cathedral, a Roman Catholic Cathedral; the Scots Church, with a fine steeple; and several other fine churches. There are several 'sky-scraper' office and store buildings; many banks and business premises are attractive. Charitable and benevolent institutions are numerous. There are several parks and other grounds for public recreation, and among these the Botanic Garden deserves special notice on account of its extent (100 acres), its beauty, and the value of its collection of trees and plants. The beautiful Fitzroy Gardens also deserve special mention. Melbourne is the centre of about a dozen converging lines of railway, several, however, being only suburban lines. The temperature is moderate; the mean of the year being 50°, and the variation between the average temperature of January (midsummer) and July (winter), 19°. The annual rainfall is about 32.33 in. Melbourne occupies the first rank among the ports of the British colonies, and is the most important trading town of the southern hemisphere. The chief exports are gold, silver, wool, hides, cattle, and sheep. Six-sevenths of the entire commerce of the colony is carried on by Melbourne. Vessels drawing 24 ft. can come up to the mouth of the Yarra-Yarra, but are unable to ascend the river, on account of two bars which obstruct its course. Improvements in recent years give clear passage to the city for vessels drawing 16 ft. Melbourne, however, is connected with Sandridge, on Port Phillip, by a railway 2 m. long. The chief industrial establishments of Melbourne are flour-mills, tallow-boiling works, and brass and iron foundries. It is the see of an Episcopal bishop and a Roman Catholic archbishop.

Port Phillip, on which Melbourne is situated, is a spacious and beautiful inlet of the South Pacific Ocean, on the southern coast of Australia, and is 35 m. long by about 25 m. broad. Its entrance, only 2 m. in width, is formed by two projecting promontories, called the Heads; and on these promontories strong fortifications were erected 1861. Navigation at the entrance of the port is difficult, on account of the foul ground on either side,

and the violence of the ebb and flood tides, due to the unevenness of the bottom.

Melbourne was colonized 1835, and received its name from Lord Melbourne, then the British prime minister, 1837. It became the seat of a bishop 1847, and in 1851 capital of the newly formed colony of Victoria. For the discovery of gold in Victoria 1851, which gave such a surprising impetus to the material prosperity of Melbourne, see VICTORIA. A centennial exhibition was held in 1888 in celebration of the founding (in 1788) of the Australian colonies. A great conflict between labor and capital took place in 1890, and a strike by the labor-unionists took place on a very extensive scale both in Victoria and New South Wales. In 1892-3, Melbourne suffered severely from commercial depression, financial crises, and banking disasters. The first parliament of the commonwealth of Australia was opened in the Exhibition building 1901, May 9, by the Duke of Cornwall and York (now Prince of Wales). Pop. (1901) city proper 63,380, with suburbs 493,956.

MELBOURNE, WILLIAM LAMB, Viscount: English Prime Minister: 1779, Mar. 15—1848, Nov. 24; b. London; second son of Sir Peniston Lamb, of Brocket Hall, Herts, who was raised to the peerage. His university education he received first at Trinity College, Cambridge; next at Glasgow, where he studied jurisprudence and politics. He entered the house of commons 1805, and joined the whig opposition, under the leadership of Charles James Fox. He accepted the chief secretaryship of Ireland in Canning's government, and this partial alienation from the whigs was increased when he not only took office under Lord Goderich, but remained for a short time in the government of the Duke of Wellington. In 1828 the death of his father transferred him to the upper house. In 1830 he accepted the seals of the home office in the government of Earl Grey, but his administration was not popular or successful. 1834, July, Earl Grey retired, and William IV. sent for Melbourne. In Nov., the king chose to consider the removal of Lord Althorp to the upper house as the breaking up of the Melbourne ministry, and sent for Sir Robert Peel, to form a conservative administration. But the house of commons resented the interference of the crown; and a new parliament having shattered the new government, Melbourne again became first lord of the treasury. On the accession of Queen Victoria, 1837, it became the duty of Melbourne to advise the young sovereign in the various duties of her high station. In 1841 his government was succeeded by that of Sir Robert Peel and thereafter Melbourne took little part in public affairs. He had little oratorical faculty, and was ineffective as a speaker, but his cordial frankness of manner made him many friends. He possessed classical tastes and rare social qualities. Sydney Smith, in his second letter to

Archdeacon Singleton, described his character with an exquisite mixture of sarcasm and compliment. He married (1805) a daughter of the Earl of Bessborough, who, under the title LADY CAROLINE LAMB (1785–1828), attained some celebrity as a novel-writer and a correspondent of Lord Byron.

MELCHISIDICIAN, n. *měl-kĭz-ĭ-dĭ'shan* [from *Melchizedek* (q.v.), Heb. *Malki-tsedheq*, King of righteousness]: in *chh. hist.*, one of a sect of heretics in the third c. who affirmed Melchizedec was the power of God, and superior to Christ; and that he sustained the office of an intercessor for angels in heaven, as Christ did for men on earth.

MELCHITES, *měl'kīts:* Christians in Syria and other parts of the East, who, acknowledging the authority of the pope and the doctrines of the Church of Rome, adhere to the liturgy and ceremonies of the Eastern Church. They conduct divine service in the vernacular tongue, and receive the Lord's Supper in both kinds. Their priests may be married before ordination, but not their bishops. They are found chiefly in Aleppo and Damascus. Their patriarch resides at Damascus. The name M. (Royalists) dates from the 5th c., when they were supported by the emperors against the Monophysites (q.v.).

MELCHIZEDEK, *měl-kĭz'e-děk* (King of righteousness): 'King of Salem, and Priest of the Most High God' (Gen. xiv. 18–20), who met Abraham returning from his victory over the kings, and blessed him, and to whom Abraham gave tithes: see Heb. vii. 3. The majestic and mysterious figure of this royal priest, appearing without recorded genealogy, and whose priestly office, far antedating the Mosaic law, could be traced to no human ordination or succession, caused him to be set forth in Ps. cx. (comp. Matt. xxii. 42–46) and in Heb. vi. 20 and Heb. vii. as a prefigurement of the Messiah, the uncreated King and Priest. Some have sought to identify M. with Shem, sole survivor of the deluge; some have deemed him a manifestation of the Son of God in human form: such conjectures are interesting, but vain.

MELCH'THAL, ARNOLD VON: see SEMPACH.

MEL'COMBE RE'GIS AND WEY'MOUTH: see WEYMOUTH.

MELDER, n. *měl'dėr* [Icel. *meldr*, flour or corn in the mill; *mala*, to grind]: corn or grain of any kind sent to the mill to be ground; the quantity of corn or meal ground at one time.

MELEAGER, *me-le-ā'jėr:* legendary Greek hero: see CALYDONIAN BOAR: ATALANTA.

MELEAGRINA: see PEARL OYSTER.

MELEAGRIS, n. *mĕl-ĕ-ā′grĭs* [L., a guinea fowl—from Gr. *Meleagros*, the son of Œneus, and one of the combatants at the Calydonian boar-hunt. It is fabled that his sisters were changed into guinea-fowl, whence the scientific name of the genus]: a turkey; genus of gallinaceous birds of the family *Meleagridæ*, of which it is the type.

MÊLÉE, n. *mā′lā* [F. *mêlée*]: a crowding and confused fighting; a scuffle between a number of persons; a confused debate.

MELEGNANO, *mā-lĕn-yâ′nō*, or MALEGNANO, *mâ-lĕn-yâ′nō*, formerly MARIGNANO, *mâ-rēn-yâ′nō:* town of n. Italy, 10 m. s.e. of Milan: pop. 5,500.—M. is famous as the scene of a great victory by Francis I. of France over the Swiss and Milanese 1515, Sep.: more than 20,000 men were slain. This conflict has been termed *the Battle of the Giants.* Francis accepted the honor of knighthood on the field from the Chevalier Bayard.—A second battle was fought here 1859, June 8, between a French force of 16,000 men, under Marshal Baraguay d'Hilliers, and a body of Austrian troops, in which the latter were routed with a loss of about 1,400 killed and wounded.

MELENA: see MELÆNA.

MELENDEZ VALDES, *mā-lĕn′dĕth vâl′dĕth*, Don JUAN: distinguished Spanish poet: 1754, Mar. 11—1817, May 24; b. at the village of Ribera del Fresno, in Estremadura. He studied at Madrid; and subsequently at Salamanca, where he became intimate with the poet Cadalso, and acquired a thorough knowledge of English. It was Locke, he said, who first taught him to reason, and his writings contain imitations of Pope, Thomson, and Young. In his earlier period, he wrote admirable Anacreontics in praise of student-life; his descriptive poetry also is excellent. His style and sentiment are simple and natural; and the national idioms are used with singular grace and vigor. The first collection of his verses appeared 1785, and soon became very popular. Four years before this publication, M. V. was appointed prof. at Salamanca, and high political honors seemed in store for him; but during the French invasion he allowed himself to be cajoled by Murat, and afterward by Joseph Bonaparte—a weakness as disastrous as it was discreditable. When the invaders were driven out of the peninsula, the unhappy poet was forced to accompany them. He died in poverty, a proscribed traitor, at Montpellier. M. V.'s Anacreontics are the writings on which his fame rests, and they have procured for him the title of *Restaurador del Parnaso.*

MELETIANS, *me-lē′shĭ-anz:* Christian sect in Egypt and Palestine, from the beginning of the 4th c. till the 5th c.; followers of Meletius or Melitius, bp. of Lycopolis, in Thebais (abt. 260—abt. 326). They called themselves the *Church of the Martyrs*, refusing to receive on repentance and penance many Christians who in the persecution under Diocletian had been led to renounce their faith. This refusal divided the M. from the church.

MELFI, *mĕl′fē·* ancient episcopal town of s. Italy,

province of Potenza, 32 m. s. of Foggia, on a feeder of the Ofanto (anc. *Aufidus*). It is on a bed of lava n.e of the lofty (3,000 ft.) volcanic Monte Volture, now extinct, from which it is separated by a deep ravine. The magnificent cathedral, erected 1155, was almost entirely destroyed by an earthquake 1851, which at the same time levelled many fine buildings, public and private, and destroyed about 1,000 persons. The only evidences of volcanic action are the severity of the earthquakes which occasionally desolate the district, and the emission at times of carbonic acid and other gases from the lakes in the old crater of the volcano, throwing up columns of water, accompanied by internal rumblings. This phenomenon generally takes place when Vesuvius is in activity. The district around the city is celebrated for its wine. Pop. of M. 11,725.

MELIACEÆ, *mĕl-ĭ-ā′sē-ē:* natural order of exogenous plants; containing nearly 200 known species, trees and shrubs, natives of warm climates, and mostly tropical. Many of the species possess bitter, astringent, and tonic properties; some are used in medicine; the seeds of some yield useful oil; some are poisonous; some yield pleasant fruits; the wood of some is valuable. See CARAPA.—The Lanseh is the most esteemed fruit of this order; and next to it is *Milnea edulis*, a fruit of n.e. India, of which the edible part is the large succulent aril. —The CAPE ASH (*Ekebergia Capensis*) is noticeable among the timber trees of this order: it has a trunk two ft. in diameter, and yields excellent tough timber, useful for many purposes.—*Melia Azedarach*, a tree about 40 ft. high, with large bipinnate leaves, native of Syria and other parts of the East, has long been planted as an ornamental tree in s. Europe, and is now common in the southern states of the American Union. Its flowers are in large spikes, and very fragrant. The fruit is of the size of a cherry, somewhat elongated, pale yellow, containing a brown nut. The nuts are bored and strung for beads in Rom. Cath. countries, whence the tree is often called BEAD TREE. It is known also as *Pride of India*, and is sometimes erroneously called *Persian Lilac*. The fruit is sweetish and not poisonous, though generally reputed so. The bark of the root, which is bitter and nauseous, is used as an anthelmintic. The pulp of the fruit of the NEEM TREE or MARGOSA TREE (*Azadirachta Indica*) yields a fixed oil, which is bitter, stimulant, and anthelmintic. The bark is a valuable tonic. The leaves are universally used in India for poultices.

MELIBŒAN, a. *mĕl′ĭ-bē′ăn* [L. *Melĭbœus*, one of the two interlocutory speakers in Virgil's first Eclogue]: consisting of alternate stanzas or speeches; alternate, as stanzas or speeches.

MELICERIS, n. *mĕl′ĭ-sē′rĭs* [Gr. *melikērĭs*, a tumor on the head—from *meli*, honey; *keros*, wax]: in *surg.*, a tumor inclosed in a cystis, and consisting of matter like honey. MELICEROUS, a. *mĕl-ĭs′ĕr-ŭs*, pertaining to a tumor containing matter like honey.

MELIC-GRASS, *mĕl'ĭk-* [L. *mel;* Gr. *meli*, honey], (*Melica*): delicate genus of grasses growing in the shade of woods, of order *Graminĕæ;* having a lax panicle, and spikelets of 2–5 awnless florets, of which one generally is imperfect. *M. uniflora* is of graceful and delicate appearance: cattle are fond of it. *M. nutans* is less common. *M. altissima*, a Siberian species, growing to the height of 3 or 4 ft., has been introduced in parts of Europe, and yields a considerable bulk of herbage: it is perennial.

MELICOCCA, *mĕl-ĭ-kŏk'a :* genus of trees or shrubs of nat. order *Sapindaceæ;* one of which, *M. bijuga*, native of the W. Indies, is there universally cultivated for its fruit. It is called the HONEY BERRY and the *Jamaica Bullace Plum;* by the Spaniards, *Monos;* by the Dutch, *Knipnee.* It is 16 to 20 ft. high. The fruit is jet-black, about the size of a bullace. The seeds are roasted, and eaten like chestnuts. Other species of M. yield eatable fruits.

MELIKOFF, *mĕl'ĭ-kof,* LORIS-, MICHAEL TARIELOVICH, Count: 1826, Jan. 1—1888. Dec. 26: soldier; b. Transcaucasia. He was of Armenian origin, educated in Moscow, joined the hussars at St. Petersburg, served in the Crimean war as col., commanding a regt. of light cavalry, took part in the capture of Kars, and was given command of the place, with rank of gen. In the Caucasus campaign against Shamyl, conducted by Muravieff, M. served with distinction, and 1860 he was made gov.gen. at Vladi-Kavkas, in Caucasia. In active service, as adjt.gen. under Grand Duke Michael, in the Turko-Russian war, he had chief direction of the operations of the army of the Caucasus, captured Ardahan 1877, May, and Kars in Nov., and at the end of the war was made count. His next service was in measures, 1879, for checking the plague on the Volga, where he was sent as gov.gen.; and when, in Apr. of the same year, the nihilist disturbances provoked the application of martial law at six principal centres of the empire, M. was intrusted with this duty at Kharkov. The nihilist attempt, 1880, Feb. 17, to destroy the czar, by exploding a mine under the dining-room of the winter palace, led to the naming of M., Feb. 24, as head of a supreme executive commission of safety, clothed with almost unlimited power. The day following the celebration (Mar. 2) of the 25th anniversary of the czar's accession, M. was shot at by an assassin, but not hit. The efforts of M. to check nihilism were accompanied by plans for liberal reform. The special commission was abolished 1880, Aug., and M. named minister of the interior. He, however, in Sep., warned the journals against discussing constitutional reforms, and when, early in 1881, he had begun to execute his scheme for giving limited rights to the people and removing social grievances, the success, Mar. 13, of a new plot to kill the czar, defeated his plans. The new czar was reluctant to even consider M.'s proposals, and issued May 11 a manifesto wholly contrary to them; and May 16 he accepted M.'s resignation.

MELILOT, n. *měl'ĭ-lŏt* [L. and Gr. *melílōtos* a species of clover—from Gr. *meli*, honey; *lōtos*, the lotus: F. *mélilot*], (*Melilotus*): genus of clover-like plants of nat order *Leguminosæ*, with ternate leaves, differing from the clovers in the generally elongated racemes of flowers the stamens not adhering to the corolla, and the 1–4 seeded tumid pods. All the species have a strong peculiar sweetish smell, which becomes more agreeable when they are dried, and is due to the presence of Coumarine (q.v.).—The COMMON YELLOW M. (*M. officinalis*) is found in bushy places and the borders of fields in most parts of Europe. It has an erect stem, two or three ft. high, and long loose axillary racemes of yellow flowers. A water distilled from the flowers is used in perfumery. The herbage is relished by cattle, but the produce is not large. It is an annual, but if frequently mowed without being permitted to flower, lives for several years.—The WHITE M. (*M. vulgaris* or *leucantha*) is common in parts

Melilot.

of Europe. Both the yellow and the white abound as immigrants in the United States, and are known as SWEET CLOVER.—The BLUE M. (*M. cærulea*), native of n. Africa, is cultivated in Europe. It was formerly much used in medicine as an anodyne, discutient, diuretic, sudorific, expectorant, and vulnerary; and to the many good qualities supposed to belong to it may be ascribed the high estimation in which the *Schabzieger* or *Chapzieger* cheese of Switzerland is held, to which it imparts its flavor. Where this cheese is made in considerable quantities, the smell of M. can be discerned even at a distance.—BOKHARA CLOVER (*M. arborea*) has attracted attention on account of the fibre of its stem, used for the same purposes as hemp.—The Messina M. (*M. Messinensis*), native of countries near the

Mediterranean, is believed to be one of the plants called *Lotus* by the ancients.

MELINE, James Florant: American lawyer and author: b. Sackett's Harbor, N. Y.; d. Brooklyn, N. Y., 1873, Aug. 14. He was graduated at Mount St. Mary's College, Emmettsburg, Md., and went to Cincinnati, where he was one of the professors at the 'Athenæum'; and, while teaching, studied law. He was also one of the editors of the *Catholic Telegraph*. After spending some time abroad in study and travel, he returned to Cincinnati, was admitted to the bar, and commenced the practice of law; later he relinquished his profession and established a banking business, also holding consulates for France and other nations. In 1860 his business failed, and shortly afterward he enlisted in the Federal army. He served throughout the Civil war under General Pope, attaining the rank of colonel, and after the war was for two years chief of the Bureau of Civil Affairs in the third military district. At the end of that time he went to New York, and devoted himself to literary work, writing for the *Galaxy*, the *Nation*, and the *Catholic World*. In the latter periodical he first published the articles controverting Froude's statements and conclusions in regard to Mary Queen of Scots; these articles, which aroused wide interest, were afterward revised and published in book form under the title *Mary Queen of Scots and Her Latest English Historian* (1871). He also wrote: *Two Thousand Miles on Horseback* (1867); *Commercial Travelling* (1869); and *Life of Sixtus the Fifth* (1871).

MÉLINITE, *mā'lĭn-īt:* an explosive employed by the French government in charging torpedo shells and in the preparation of rupturing charges for the use of the engineer corps and cavalry in effecting demolitions. As originally used it was composed of 70 per cent. of picric acid mixed with 30 per cent. pyroxylin dissolved in 45 parts of acetone. As now used, either alone, or with cresylite, it consists exclusively of fused picric acid which is poured into the shell when in the molten condition and is cast there in such a manner as to leave a central canal in the mass in which the fuse, terminating in a mercuric fulminate detonator by which the charge is fired, may be contained. By the use of this fuse the detonation of the charge is delayed sufficiently to allow the shell to penetrate armor and reach the farther side of it before the charge explodes. Mélinite was very thoroughly tested at Bouchet in 1892 to determine the degree of safety that it possesses when exposed to shocks, fire and the accidental rupture of receptacles containing it, and the results were most favorable. Yet there have been several very serious accidental explosions with it which have been attributed to the formation of sensitive picrates through reaction of the charge with foreign bodies in the shell. The explosion of mélinite is not a complete one,

since the gaseous product contains considerable quantities of carbon monoxide which is readily combustible. It is also very poisonous. This explosive owes its name to the yellow color which is one of its chief characteristics.

MELIORATE, v. *mēl'yŏ-rāt* [mid. L. *melĭŏrātus*, improved—from *melĭŏr*, better: F. *améliorer*, to improve]: to improve; to make better. MEL'IORATING, imp. MEL'IORATED, pp. MEL'IORA'TION, n. *-rā'shŭn*, improvement; in Scotch law, the improvements made by a tenant on the estate or farm which he occupies (see LANDLORD AND TENANT).

MELIORISM [Lat. *melior*, better]: a term applied to the doctrine that life can be made better and happier by human endeavor. Some writers take the view that such betterment is actually in progress and represents the law of moral evolution. George Eliot is said to have invented the term in distinction from pessimism on the one hand and optimism on the other. Our world is neither the best possible world nor the worst possible. It is a partly bad and partly good affair capable by our efforts of betterment, both negatively by a decrease in the amount of suffering, and positively by the increase of the sources of happiness.

MELIPHAGOUS, a. *mĕ-lĭf'ă-gŭs* [Gr. *meli*, honey; *phagein*, to eat or consume]: honey-sucking—applied to certain birds. MELIPHAGIDÆ: see HONEY-EATER.

MELIS'SIC ACID AND MELIS'SIN: see WAX.

MELIS'SUS, of Samos: see ELEATIC SCHOOL.

MEL'ITA: see MALTA.

MELITOSE, n. *mĕl'ĭ-tōs* [Gr. *meli*, honey, *melĭtos*, of honey]: a kind of sugar obtained from the manna of various species of Eucalyptus of Australia and Tasmania. MELEZITOSE, n. *mĕl-ĕz'ĭ-tōs*, a kind of sugar found in the so-called manna, exuding from the young shoots of the larch.

MELL, v. *mĕl* [F. *mêler*, to mix]: in *OE.*, to mix; to mingle. MELL'ING, imp. MELLED, pp. *mĕld*. MELL-SUPPER, the harvest-supper—so named because servants and superiors sat mingled indiscriminately. PELL-MELL, confusedly; all in a heap.

MELL, n. *mĕl* [L. *mel*, honey; *mellis*, of honey]: in *OE.*, honey. MEL'LIC, a. *-ĭk*, of or belonging to honey; anything honey-like.

MELLATE, n. *mĕl'lāt*, or MELLITATE, n. *mĕl'lĭ-tāt* [L. *mel*, honey, *mellis*, of honey; Gr. *meli*, honey]: a salt of mellic or mellitic acid. MELLIC, a. *mĕl'lĭk*, or MELLITIC, a. *mĕl-lĭt'ĭk*, containing saccharine matter; pertaining to or derived from honey-stone.

MELLIFEROUS, a. *mĕl-lĭf'ĕr-ŭs* [L. *mellĭfer*, honey-bearing—from *mel*, honey; *fero*, I carry or produce]: producing honey.

MELLIFICATION, n. *mĕl'lĭ-fĭ-kā-shŭn* [L. *mel*, honey; *făcĭō*, I make]: the making or production of honey.

MELLIFLUOUS, a. *mĕl-lĭf'lû-ŭs*, or MELLIF'LUENT, a. *-û-ĕnt* [mid. L. *melliflŭŭs*, flowing like honey—from L. *mel*, honey; *flŭō*, I flow]: flowing as with honey; sweetly-flowing, generally applied to sound; soothing. MELLIF'LUOUSLY, ad. *-lĭ*, or MELLIF'LUENTLY, ad. *-lĭ*. MELLIF'LUENCE, n. *-ĕns*, a flow of sweetness.

MELLIGENOUS, a. *mĕl-lĭj'ĕ-nŭs* [L. *mellĭgĕnus*, produced from honey, honey-like—from Gr. *meli*, honey; *gĕnŏs*, stock, kind]: having the qualities of honey; producing honey.

MELLIT, n. *mĕl'lĭt* [L. *mel*, honey, *mellis* of honey]: a dry scab on the fore foot of a horse, said to be cured by a mixture of honey and vinegar.

MELLITATE. See MELLATE.

MELLITE, n. *mĕl'līt* [L. *mel;* Gr. *meli*, honey]: honey-stone, a peculiar substance found in beds of lignite.

MELLIT'IC ACID, MELLIC ACID, or BENZENE HEXACARBOXYLIC ACID: an organic acid having the formula $C_{12}H_6O_{12}$, or $C_6(COOH)_6$. It may be prepared by oxidizing charcoal with potassium permanganate, $KMnO_4$; but it is best obtained from its aluminum salt, which occurs native as the mineral melilite. The pulverized melilite is boiled with ammonium carbonate; ammonia is added to throw down the aluminum, and the filtrate is evaporated until the ammonium salt of the acid separates out. This is re-dissolved, precipitated by lead acetate, and the precipitated mellate of lead is decomposed with sulphuretted hydrogen gas, which liberates the acid in the free state. Mellitic acid is readily soluble in alcohol and in water, and from its alcoholic solution it crystallizes in the form of silky needles. Heat decomposes it, with liberation of carbon dioxid, and the formation of a new substance, $C_{10}H_6O_8$, known as 'pyro-mellitic acid.' Numerous salts of mellitic acid (known as 'mellates') have been prepared, but neither the acid nor its compounds are of any special industrial or scientific importance.

MELLO, *mā'lō*, CUSTODIO JOSÉ DE: Brazilian admiral: b. about 1845; d. 1902, Mar. 16. In 1889, he took a prominent part in the revolution, was promoted to be admiral, and was appointed minister of the navy. Four years later he formed a plot in behalf of the Federal party and the navy, against the party of the army and its candidate for re-election, President Peixoto; bombarded and blockaded Rio de Janeiro; and, when forced out of the harbor by vessels of foreign navies, notably American, occupied Rio Grande do Sul. He could not agree with his lieutenant, Saraiva, however, and so surrendered to the government of Argentina. In 1901, he was accused, in spite of his former republicanism, of plotting to establish an empire, and was interned upon the island of Cobras.

MELLONI, MACEDONIO, *mâ-chā-dō'nē-ō mĕl-lō'nē*, Italian physicist: b. Parma, 1798, Apr. 11; d. Portici, near

Naples, 1854, Aug. 11. He first became professor of natural philosophy at the University of Parma, where between 1824 and 1831 he taught hygrometry. Political events having compelled him in the latter year to expatriate himself, he went to Geneva, where he made several important discoveries respecting the radiation of heat, which he presented in 1833 to the French Academy of Sciences. Later discoveries won him the Rumford medal from the Royal Society of London. Through the influence of his friends Arago and Humboldt, he was enabled to return to Italy, and was appointed by the king of Naples director of the meteorological observatory on Mount Vesuvius. Among the results of his labors at this institution was the discovery of heat in lunar light, which led to the determination of the analogy of radiant heat to light. Political troubles again interrupted his labors, and for his presumed sympathy with liberal principles he was in 1849 ejected from his post. In 1850, he published the first volume of a work entitled *La termocrasi, o la colorazione calorifica*, containing an account of his theory of the 'coloration of light,' and of his experiments on the diffusion of heat by radiation, and particularly of its transmission through transparent media. Subsequently he gave much attention to the study of electricity, and combated the conclusions of Faraday with regard to the transmission of currents over submarine wires.

MELLOW, a. *mĕl'lō* [Ger. *moll*, soft, ripe; *molich*, mellow: Dut. *molen*, to decay: OF. *molle*, mellow, overripe: W. *mallu*, to rot]: mature; soft with ripeness; pleasing by softness, as sound, light, or flavor; soft and jovial, as a person slightly intoxicated: V. to ripen; to soften, as by maturity or age; to grow or become mature or soft. MEL'LOWING, imp. MELLOWED, pp. *mĕl'lōd*, ripened; brought to maturity. MEL'LOWLY, ad. *-lĭ*. MELLOWNESS, n. *-nĕs*, ripeness; softness; maturity. MEL'LOWY, a. *-ĭ*, soft.

MELO'DEON. See HARMONIUM.

MELODICON, n. *mĕ-lŏd'ĭ-kon* [from *melody*]: an instrument made of steel bars in different lengths, tuned to the diatonic scale, struck with hammers held in the hand.

MELODRAMA, n. *mĕl'ō-drăm'ă*, also spelled MEL'ODRAME, n. *drām* [F. *mélodrame*—from Gr. *melos*, a song or tune; *drama*, a drama: It. *melodramma*]: *strictly*, a dramatic performance in which music is intermixed. The name was applied first to the *opera*, by its inventor, Ottavio Rinuccini. In Germany the term melodrama retains its original application; but in France, England, and the United States, it denotes a dramatic piece characterized by romantic and sensational incidents, and in the performance of which gorgeous scenery and decorations are accorded a prominent place. MEL'ODRAMAT'IC, a. *-dră-măt'ĭk*, having the character of a melodrama.

MEL'ODRAM'ATIST, n. *-drăm'ă-tĭst*, one skilled in melodrama.

MELODY, n. *měl'ŏ-dĭ* [Gr. *melōdĭă*, musical measure, sweet singing—from *melos*, a tune, an air; *ōdē*, a poem or song]: sweetness of sound. The term in music is applied to an agreeable succession of a single series of notes or tones. It is distinguished from Harmony, in which different notes, being chords, are sounded together. The part intended for the leading voice in a harmonized piece of music is often called the melody or *air*. Melody involves *form*, i.e., the melodic sequence presents a unitary whole, of which each note is a constituent member. The melody may either be complete in itself (e.g., in the song) or it may enter into a larger musical structure, e.g., in the opera or oratorio). The essential factors of melodic form are rhythm and fixed pitch relations. (1) Rhythm involves regularly recurrent groups of accented and unaccented elements. The rhythmic unit is the measure. In a melody, a given type of rhythm is maintained. The degree of accent, or stress, and the temporal relations vary, however, from measure to measure, thus enhancing the effectiveness of the whole structure. An analogous variability of rhythmic form is to be found in the poetic line or verse, where, as in melody, each rhythmic unit is an organized individual which contributes to the æsthetic value of the composition taken as a whole. The melodic phrase like the poetic line is obviously, then, not a mere repetition of identical measures or feet, but an immensely rich and complicated aggregate (apart from its tonal resources) of differentiated and individualized components. (2) Fixed pitch relations introduce to melody *tonal form* which implies (i) reference to a base or starting point, the *tonic*, and (ii) the proper succession of fixed qualitative distances (pitch differences, as c-e, f-b). Both of these essential factors of tonal form are represented abstractly (i.e., apart from the concrete melody) in the scale (see SCALE). On the side of rhythm melody stands closely related to the dance, and, on the side of tonal form, to harmony. In declamation and recitative, which involve both rhythm (measured speech) and qualitative variety (vocal inflexion), is to be found a form of art which stands still closer to melody. The intimacy of the latter relation is emphasized in that one of the current theories of melody that derives melody, through recitative, from a primitive form of declamation. MELODIOUS, a. *měl-ō'dĭ-ŭs*, musical; agreeable to the ear by a sweet succession of sounds. MELO'DIOUSLY, ad. *-lĭ*. MELO'DIOUSNESS, n. *-nĕs*, the quality of being melodious. MELODIZE, v. *měl'ŏ-dīz*, to make melodious; to form into melody. MEL'ODIZING, imp. MEL'ODIZED, pp. *-dīzd*. MEL'ODIST, n. *-dĭst*, a composer or singer of melodies. MEL-OD'ICS, n. *-ŏd'ĭks*, branch of the science of music which treats of the laws of melody and the pitch of tones.—SYN. of 'melody': harmony; concord; unison; accordance.

MELOGRAPH, n. *mĕl'o-grăf* [Gr. *melos*, a song; *grapho*, I write]: an instrument designed to write down melodies as played upon a pianoforte.

MELON, n. *mĕl'ŏn* [Gr. *mēlŏn*, an apple: F. and Sp. *melon*, a melon], (*Cucumis melo*): plant, also its fruit, of the same genus with the Cucumber (q.v.). The M. is much cultivated for its fruit, which is sweet, with a delicious though peculiar flavor and smell. The M. is an annual, with trailing or climbing stems, lateral tendrils, rounded angular leaves, small, yellow, monœcious flowers, and large round or somewhat ovate fruit. It is supposed to be a native of sub-tropical Asia, though it has never been discovered in a wild state, and it was introduced into England from Jamaica about 1570. It is said to

Common and Water Melon.

derive its name from the Grecian island Melos. Its English name was originally *Musk Melon*. The varieties in cultivation are very numerous, some of them distinguished by a thick and warty rind, some by a rind cracked in a net-like manner, some by ribs and furrows, some by a perfectly smooth and thin rind; they differ also in the color of the *flesh* of the fruit, which is green, red, yellow, etc.; and in the size of the fruit, which varies from three or four inches to 12 inches or more in diameter. The M. is eaten usually without condiments, sometimes with sugar, and sometimes with pepper or ginger. The M. is raised in immense quantities in the southern states, and in parts of the s. middle states. It thrives best in a loamy soil. The *setting* of the fruit, by dusting the female flower with the pollen of the male flower, is constantly practiced by gardeners. Warmth and bright sunshine are requisite to the production of fruit of good quality.—The WATER-M. or CITRUL (*Cucumis citrullus*) is highly esteemed and much cultivated in almost all warm countries. The markets of the United States are plenti-

fully supplied with this favorite fruit, from the middle and especially the southern states. It is a native of the warm parts of the old world. It has deeply lobed and gashed leaves, and a large round or oval fruit with smooth dark-green spotted rind, and pink or white flesh, less sweet than the M., but much more juicy or watery, and therefore much prized in many warm countries, not merely for food, but for quenching thirst and allaying fever.—S. Africa has another species of WATER-M. (*C. Caffer*), very valuable to the inhabitants.—The CHATE (*C. Chate*) is a native of Egypt and Arabia. Its taste is sweet, and as cool as the water-melon.—The KAUKOOR (*C. utilissimus*) is a native of India; it has oval fruit about six inches long, smooth, variegated with different shades of yellow, with much the flavor of the melon: the fruit will keep for several months, and is used raw and in curries. The half-grown fruit is pickled. The seeds contain much farina and oil, and are ground into meal; the oil is expressed, and used for food and in lamps. The seeds of others of this genus may be used in the same way; and they are said to be useful as a diuretic medicine and for relief of strangury. MELON-FRAME, a glazed frame for raising melons.

MELOPIANO, n. *mĕl-ō-pĭ-ân′ō* [Gr. *melos*, a song; Eng. *piano*]: invention by which sustained sounds can be produced on a pianoforte. It was invented by Caldara of Turin, 1870.

MELORIA, *mā-lō′rē-â*: small island in the Mediterranean, about five m. in length and one in breadth, four m. from Leghorn. In the vicinity of M., 1284, the Genoese gained a famous naval victory over the Pisans, by which the Pisans were deprived of their maritime supremacy. An ancient Pisan tower stands on a rock s. of Meloria.

MELOS, *mē′los*, or MILO, *mē′lo*: island at the s.w. corner of the Grecian archipelago, in line with the extension into the Ægean Sea of Attica, about 60 m. distant. It is of volcanic origin, with a vast natural harbor penetrating from the n. nearly through the island, and evidently formed by the old volcanic crater. Volcanic action is still seen in the emission of smoke and sulphurous vapors from Mt. Kalamo, and in a remarkable cluster of hot sulphurous springs on the e. shore of the harbor. Sulphur and alum are found, and gypsum, salt, and millstones are exported. Cotton, barley, and vines are cultivated, and orange, olive, cypress, and arbutus trees grow abundantly. With Antimilos, 5 m. n.w., 4 sq. m. in extent, Cimolos, 1 m. n.e., 16 sq. m., and Polinos, also very near, 5½ sq. m., the whole territory of M. amounts to about 80 sq. m. Most of this is rugged and hilly, and Mt. Elias has a height of 2,538 ft. Cimolos was famous anciently for figs and fuller's earth, and still shows the remains of a considerable city. The ancient city of Melos, of Phœnician origin, but Hellenized by Dorians, was built terrace-fashion round a hill in the n.e. of the

main island; and in size and beauty it was a notable Greek centre. Its painted vases, bronzes, gold ornaments, and other objects of art, attest the skill of its workmen. The finest known representation of Aphrodite, the 'Venus of Milo,' was found 1820, near the site of the ancient theatre of M. Athens subjugated M. B.C. 416, massacred or enslaved the people, and introduced Attic colonists. Dorian power was restored by Lysander about B.C. 404, but without a return of prosperity. A remarkable cluster of catacombs, with frescoes, etc., of Christian origin, are found at Tripiti, s.e. of the ancient city of M.—Pop. of M., with dependent islands, abt. 5,500.

MELPOMENE, n. *měl-pŏm'ĕ-nē* [Gr. *melpoměnē*, the songstress—from *melpŏmai*, I sing praises]: one of the nine Muses, the Muse who presides over tragedy.

MELROSE, n. *měl'rōz* [L. *mel*, honey; *rosa*, a rose]: honey of roses.

MELROSE': city in Middlesex co., Mass., 8 m. n. w. of Boston, on the Boston and Maine r.r. It is a very attractive suburb of Boston, and has some thriving manufactures. It has water-supply from Spot pond. M. has a pub. pk. and library. Pop. (1900) 12,962; (1910) 15,715.

MELROSE, *měl'rōz* or *měl-rōz'*: pleasant village of Roxburghshire, Scotland; at foot of Eildon Hills, on s. bank of the Tweed, 37 m. by rail s.s.e. of Edinburgh. Pop. (1891) 1,432. It is famous for ruins of its noble Cistercian abbey, founded by King David I. 1136. The original pile having been destroyed during the wars of the succession, its rebuilding began about 1326. The work was helped by large grants from King Robert Bruce and his son King David II., but proceeded so slowly that it was scarcely finished at the Reformation, in the middle of the 16th c. Its progress had been hindered by a second destruction 1385, by Richard II. of England. It was in the Second Pointed style, with one or two approaches to Third Pointed, and was beyond doubt the most beautiful structure in Scotland in the middle ages. What now remains are the chief portions of the conventual church, 251 ft. in length, and some fragments of the cloister, which seems to have been a square 150 ft. deep. The tracery and carvings, in stone of singular excellence, are scarcely surpassed by any in England. In the pages of Walter Scott, M. shines with a splendor which its meagre history fails to sustain. Its line of abbots showed one saint, St. Waltheof, stepson of its royal founder. King Alexander II. chose his sepulture within its walls; Bruce left it the legacy of his heart; and it gave tombs to that flower of Scottish chivalry, the Knight of Liddesdale, and to his kinsman, the heroic Douglas, who fell at Otterburn. But its annals have little else to record. As a seat of piety and learning, its renown is eclipsed by the older and humbler columbite monastery founded by St. Aidan, about the middle of the 7th c., and commemorated by the Venerable Bede as the

home of Eata, of Boisil, of Cuthbert, and of Drycthelm. 'Old Melrose,' as it was called after the 12th c., stood about 2 m. below the modern abbey, on a beautiful promontory almost encircled by the Tweed. It was burned by Kenneth, King of Scots, 839, and seems never to have recovered from the blow. After it had lain waste many years, we hear of it about 1073 as giving shelter, for a short season, to a few fugitive monks. All that survived the erection of the later abbey was a chapel dedicated to St. Cuthbert, and still famous about the middle of the 15th c. as a resort of pilgrims. The *Chronica de Mailros,* a series of brief obits and annals from 731 to 1275, has been twice printed—first among the *Quindecem Scriptores Historiæ Anglicanæ,* published by Bishop Fell, Oxford, 1684; again by Joseph Stevenson, for the Bannatyne Club, Edinburgh, 1835. The charters of the more modern abbey were printed by Cosmo Innes, Edinburgh, 1837, for the same society at cost of the Duke of Buccleuch, in two sumptuous quartos, with the title *Liber S. Marie de Melros.*

MELT, v. *mĕlt* [Icel. *melta,* to digest: Dut. *smelten,* to melt: O. Slav. *mladu,* soft: AS. *molsnian,* to rot: Gr. *meldo,* I make liquid]: to make liquid by heat; to soften or subdue, as the heart or feelings; to liquefy; to thaw; to dissolve; to become liquid; to be dissolved; to be softened to love, pity, or tenderness; to be subdued by grief or affliction; to faint. MELT'ING, imp.: ADJ. dissolving; liquefying; softening into tenderness: N. the act of dissolving or melting; the act of softening. MELT'ED, pp.: ADJ. made liquid; dissolved: or MOLTEN, pp. *mōlt'n:* ADJ. made of melted metal. MELT'ER, n. *-ĕr,* one who melts.—SYN. of 'melt': to fuse; soften; subdue; mollify; relax.

MELT, n. *mĕlt;* in *Scot.,* another spelling of MILT, which see.

MELTON, n. *mĕl'ton:* a heavy woollen cloth without a nap, used for overcoatings.

MELTZER, CHARLES HENRY: American playwright and journalist: b. London, England, 1853, June 7. He was educated in Paris, where he became correspondent of the Chicago *Tribune* and later of the New York *Herald,* for which paper he traveled over Europe and Egypt. In 1888 he was appointed dramatic critic of the New York *Herald,* holding that position for four seasons. From 1893 to 1896 he was dramatic reviewer of the New York *World.* His experience was utilized as literary associate in connection with a course of modern plays at Carnegie Lyceum, New York, and in Washington, Boston, and elsewhere. Among his plays are: *The Story of Rodion the Student,* and English versions of *Hannele* (Hauptmann), *Mme. Sans Gène* (Sardou and Moreau), *L'Arlesienne* (Daudet), *The Sunken Bell* (Hauptmann); a farce, *His Honor the Mayor* (with A. E. Lancaster); *Manon Lescaut; Salome* (with Silvestre and Pierne); *The First Duchess of Marlborough;* etc.

MELVILLE, *mĕl'vĭl*, ANDREW: eminent Scottish reformer: 1545, Aug. 1—1622; b. Baldovy, on the banks of the South Esk, near Montrose. He was educated at the grammar school of Montrose, whence he removed in his 14th year to the University of St. Andrews. Here he remained four years, leaving with the reputation of being 'the best philosopher, poet, and Grecian of any young master in the land.' He then went to Paris, where he continued his studies for two years. His reputation must have been already considerable, for in his 21st year he was chosen regent in the College of St. Marceon, Poitiers, whither he had gone, a perfect stranger, to study law. Sometime afterward he went to Geneva, where he was more in his element, both politically and religiously, and where, by the influence of his friend Beza, he was appointed to the chair of Humanity in the Academy. During his stay in Geneva, multitudes of Protestant refugees came from France at the time of the massacre of St. Bartholomew; and the influence of some distinguished men among these is said to have deepened and broadened Melville's views concerning the liberty of the church. He returned to Scotland 1574, and was, in the same year, appointed principal of the University of Glasgow, where his scholarship, energetic discipline, and intrepidity of character exercised a quickening and elevating influence. When the regent Morton exclaimed on one occasion: 'There will never be quietness in this country till half-a-dozen of you be hanged or banished,' Melville is said to have replied: 'Tush, man; threaten your courtiers so. It is the same to me whether I rot in the air or in the ground; and I have lived out of your country as well as in it. Let God be praised, you can neither hang nor exile his truth!' In 1580 Melville was chosen principal of St. Mary's College, St. Andrews. Here 'besides giving lectures on theology, he taught the Hebrew, Chaldee, Syriac, and Rabbinical languages.' In 1582 he preached the opening sermon before the General Assembly, and boldly 'inveighed against the bloody knife of absolute authority, whereby men intended to pull the crown off Christ's head, and to wring the sceptre out of his hand.' Melville's career was one of indomitable courage in opposition to James VI., in his tyrannical attempt to invade the constitutionally guaranteed liberties of the church in Scotland and to establish Episcopacy. The Assembly applauded Melville's intrepidity, drew up a remonstrance in a similar spirit, and appointed Melville and others to present it. In less than two years, Melville was summoned before the privy council, on account of a sermon preached at St. Andrews. He declined to appear, maintaining that whatever a preacher might say in the pulpit, even if it should be called treason, he was not bound to answer for it in a civil court until he had been tried first in a church court. For this denial of secular jurisdiction he was condemned to imprisonment, but escaped

to London, where he remained till the downfall of Arran in the following year. After an absence of 20 months, he returned to Scotland, and resumed his office at St. Andrews. He was repeatedly elected moderator of the General Assembly and rector of the University. A remarkable instance of his plain-speaking was at Cupar, 1596. Melville was heading a deputation to 'remonstrate' with the king. James reminded the zealous remonstrant that he was *his* vassal. 'Sirrah!' retorted Melville, 'ye are *God's* silly vassal; there are two kings and two kingdoms in Scotland: there is King James, the head of this commonwealth; and there is Christ Jesus, the King of the church, whose subject James the Sixth is, and of whose kingdom he is not a king, nor a lord, nor a head, but a member.' Melville died about 1622, but neither the date of his death nor the events of his last years are ascertained.

MEL'VILLE, George Wallace: an American naval officer; b. in New York 1841, Jan. 10; was educated at the Brooklyn Polytechnic Institute; served through the civil war as engineer; and later on various stations and at navy yards: accompanied the *Jeannette* polar expedition in 1878, the Hall relief expedition in the U. S. steamer *Tigress,* and the Greely relief expedition in 1884. In the *Jeannette* expedition he underwent the severest hardships and sufferings; commanded the boat's crews which escaped from the wastes of the Lena delta; and afterward headed the expeditions which recovered the records of the *Jeannette* expeditions and the remains of Lieut. DeLong and his companions. For bravery in the Arctic expeditions he was advanced 15 numbers by special act of congress, 1890, Sep.; appointed engineer-in-chief of navy, 1896, Jan., and rear-admiral, 1895, Mar. He was retired in 1903.

MEL'VILLE, Herman: author: b. New York 1819, Aug. 1; d. there 1891, Sept. 28. At the age of 18 he shipped as common sailor on a voyage to Liverpool; and 1841 he went again before the mast on a whaling voyage to the Pacific. Ill-treated by the captain, he deserted at Nukaheva, Marquesas Islands, and was kept four months as prisoner of a savage tribe in the Typee valley, whence he was rescued by an Australian whaler, and taken to Tahiti. After visiting the Sandwich Islands, he shipped on a United States frigate, and returned to Boston 1843. In 1846 the first literary result of his adventures was published in *Typee,* a spirited account of his residence in the Marquesas. *Omoo,* a continuation of his adventures in Oceanica, appeared 1847, in which year he married a daughter of Chief Justice Shaw of Massachusetts. *Mardi,* a strange philosophical romance, 1848, was followed by *Redburn* (1849); *White Jacket, or the World in a Man-of-War* (1850); *Moby Dick, or the White Whale* (1851); *Pierre, or the Ambiguities* (1852); *Israel Potter* (1855); *The Piazzi Tales* (1856); and *The*

Confidence Man (1857). In 1860 he embarked in a whaling vessel for a new tour round the world. *Battle Pieces* (1866) appeared after his return.

MEL'VILLE ISLAND: in the north polar sea of America; lat. 74° 30′—77° n.; long. 105° 40′—117° 30′ w.; greatest length, 200 m.; greatest breadth, 130 m. It is separated, on the w., by Fitzwilliam and Kellett Straits from Prince Patrick Island, most western island of these regions. In 1819 Lieut. Parry, who gave Melville Island its name, passed the winter here with his crews, in the vain hope of finding in summer a passage westward to the Pacific.—MELVILLE SOUND, about 250 m. long by 200 m. broad, lies s.e. of Melville Island; it communicates with the Arctic Ocean, on the w., by Banks's Strait, and with Baffin's Bay, on the e. by Barrow Strait and Lancaster Sound.

MEL'VILLE ISLAND: in the S. Pacific, w. of the extreme n. point of Australia, from which it is separated by Van Diemen's Gulf; lat. 11° 8′—11° 56′ s.; long. 130° 20′—131° 34′ e.; 70 m. long, 30 m. wide; about 1,800 sq.m. Dundas Strait leads past its e. end, and Clarence Strait past its s. point, from the gulf into the Indian Ocean. Bathurst Island on the w. would form part of Melville Island but for the narrow Apsley Strait. The level rises 130 to 200 ft. in the centre, with a coast low on the n. and w., but high and bold elsewhere. In vegetation and animals it resembles Australia. The climate is made unhealthful by heat and humidity from Oct. to May, but from May to Oct. is salubrious.

MEL'VILLE PENINSULA: land abutting from the continent of British N. America; bounded n. by the Fury and Hecla Strait, and connected with the mainland by Rae Isthmus; lat. 66° 10′—69° 50′ n.; long. 81° —87° w. It is 250 m. long, and about 1,000 m. in average breadth.

MEL'VILLE, VISCOUNT. See DUNDAS, HENRY.

MEMBER, n. *mĕm'bėr* [F. *membre;* It. *membro,* a member—from L. *membrum,* a. limb, a part of anything]: a limb or part of an animal, as a leg, an arm, an ear, etc.; a part of a discourse or of a period or sentence; one of a society or community; in *Scrip.,* one of the appetites or passions. MEMBERED, a. *mĕm'bėrd,* having limbs; in *her.,* applied to a bird having legs of different color from its body, when the bird is said to be *membered* of that color. MEM'BERSHIP, n. state of being a member; society; union. MEMBER OF PARLIAMENT, usually contracted into M.P.; one elected by a city, town, or county to represent it in the Commons' House of Parliament.

MEMBRANE, n. *mĕm'brān* [F. *membrane*—from L. *membrāna,* skin or membrane, a film: It. *membrana*]: a thin transparent layer or skin, serving to cover some part of an animal or of a plant. In *anatomy,* membrane

designates those textures of the animal body which are arranged in the form of laminæ, and cover organs, or line with the interior of cavities, or take part in the formation of the walls of canals or tubes. For the structure and special uses of some of the most important of the animal membranes, see the separate titles—e.g., MUCOUS MEMBRANE; SEROUS MEMBRANE; SYNOVIAL MEMBRANE; etc.: for the membranes in which the fœtus is inclosed—commonly called the fœtal membranes—see PLACENTA. The membranes which cover and protect the brain and spinal cord are commonly termed *Meninges,* from the Greek word *meninx,* a membrane. MEMBRANOUS, a. *mĕm'brā-nŭs,* consisting of membranes. MEM'BRANA'CEOUS, a. *-nā'shŭs,* resembling membrane; having the consistence, aspect, and structure of a membrane. MEMBRANA PUPILLARIS, very thin membrane which closes or covers the central aperture of the iris in the fœtus during a certain period of gestation, but which disappears in the seventh month. MEMBRANA TYMPANI, n. *mĕm'brā-nă tĭm'pă-nī* [L. *membrana,* a membrane; *tympanum,* a drum]: drum membrane, the membrane which separates the external from the internal ear—called the drum of the ear. JACOB'S MEMBRANE, the membrane covering the retina of the eye.

MEMBRANIFEROUS, a. *mĕm'brā-nĭf'ėr-ŭs* [L. *membrāna,* a membrane or film; *fero,* I carry or produce]: producing membranes. MEMBRANIFORM, a. *mĕm-brăn'ĭ-fawrm* [L. *forma,* a shape]: having the form of a membrane or of parchment. MEMBRANOLOGY, n. *mĕm'bră-nŏl'ŏ-jĭ* [L. *logos,* a discourse]: a description of the animal membranes.

MEMEL, *mā'mėl:* town of Prussia, the most northerly in Germany; chief town in the dist. of Königsberg; at the mouth of the Dange, and at the n. extremity of the Kurisches Haff, at its opening into the Baltic; lat. 55° 43′ n.; long. 21° 6′ e. It is a well-fortified, active seaport, with a large and excellent harbor, and is the centre of active trade in corn, wood, hemp, and amber; the produce of Lithuania and other Russian provinces being brought thither for exportation. The town is surrounded by an unproductive sandy plain. It has several manufactories of brandy, soap, linseed-oil, etc., and extensive saw-mills, iron foundries, and amber-works; also iron-works noted for their strong cables and their light and elegant cast-iron goods. Ship-building is carried on at Memel, which owns about 100 ships and has a good school of navigation; in one year, 1,200 to 1,500 vessels enter the port, and steam-packets maintain communication with many of the other Baltic ports. Memel was founded 1253 by the Livonian order of knights; 1404 it was fortified by the Teutonic knights. In consequence of a fire 1854, it has of late years undergone an almost complete renovation, and is now clean and well built. Pop. about 21,000.

MEMENTO, n. *mĕ-mĕn'tō* [L. *memento*, remember or beware]: that which reminds; a hint or suggestion; a souvenir.

MEMLING, *mĕm'lĭng* (or HEMLING, *hĕm'lĭng*), HANS: painter: 1425-95. Of the birth and early life of Memling, the little that is known shows him as a pupil of Roger van der Weyden; bred at Tournay, settled first at Brussels, and later so long at Bruges as to have been for ages credited to the school of art there. Probably Memling was brought to Bruges by his master, and in the same way credited to that place alone, though its annals tell us nothing of his origin, education, and early work. The masterpiece of his later years, a shrine of St. Ursula, finished about 1480, is in the Hospital of St. John at Bruges, but the story of his coming there a soldier, half-dead with wounds, and painting for the brethren after they had cured him is a myth. In 1473 a *Last Judgment* by him was sold at Bruges to an agent of the Medici, and a privateer of Danzig having captured the ship on which it was sent, the picture reached, and remained in, the cathedral of Danzig. This shows a fame already gained. A piece now at Munich, very little surpassed by his best work, is assigned to 1470. That the artist was very widely known is shown by the long list of his pictures in the galleries of Berlin, Vienna, Florence, Rome, Paris, Madrid, London, and in many private collections of England and continental Europe. In his style Memling improved on the strong and severe qualities of his master, softening asperities and adding tenderness and grace, especially in the sweet and perfect ideal under which he represented the mother of Christ. These qualities of his work gave to his portraits a success attained by no other painter of his time.

MEM'LOOKS. See MAMALUKES.

MEMMINGER, *mĕm'mĭn-jĕr*, CHRISTOPHER GUSTAVUS: American politician, secretary of treasury in the Confederate government: b. Würtemberg, Germany, 1803, Jan. 17; d. 1888, Mar. 7. He was brought to America in infancy, and was educated at South Carolina College. He studied law; began to practise in Charleston in 1825; entered politics as a leader of the Union party, attacked the States' Rights party in a satire called *The Book of Nullification* (1832); reformed the public school system of the state; and for 20 years was in the state legislature, much of the time acting as head of the finance committee. In 1859, after John Brown's raid, he was commissioned by South Carolina to consult with other delegates in Virginia as to the best method of warding off attacks of Abolitionists. From the formation of the Confederacy until 1864, June, he was secretary of treasury; and his mistaken policy in that office did much to ruin the Confederacy financially.

MEMNON, *mĕm'non:* mythologic hero, son of Tithonus and Eos or Aurora, who led to Troy a host of Ethiopians, to support the cause of Troy after the fall of Hector. He was said to be clad in armor made by Hephæstus or Vulcan; and to have killed Antilochus, son of Nestor, in single combat. M. was killed in single combat with Ajax or Achilles. Others suppose he was ruler of the nations between Susa and Troy, or a vassal of the Assyrian monarch Teutamus, who sent him with 10,000 Ethiopians, and as many Susians, to the Trojan war. After his death his corpse was carried by Aurora to Susa, and buried in the acropolis of that town, Memnoneia; or his ashes, collected in a silver urn, borne to his sister Himera at Paphos, and thence to Palliochis or Paltos, or to the banks of the Belos, near Ptolemais. The river Paphlagonios flowed from his blood, and his companions were changed into birds. But the M. of the older writers obtained still greater renown by the name being transferred at a later period by the Greeks to a celebrated colossus, seated in the plains of Thebes, on the left or w. bank of the Nile; while the name of Memnoneia was applied by the Egyptian Greeks to the sepulchral quarter of Thebes, as Diospolis was to the right or e. bank. Memnoneia, or supposed palaces of M., stood also at Abydos. The two statues—one of which is the celebrated vocal M., one of the wonders of the old world—are at a place called Koum-el-Sultan. Both are seated on thrones, and represent the monarch Amenophis III., of the 18th dynasty, whose name and titles are inscribed on the plinths behind. At the sides of the throne are sculptured the wife and mother of the monarch, about 18 ft. high. The height of each of these colossi appears to have originally been 60 ft., and they are made of a coarse hard gritstone or breccia. They are at present known by the sobriquets of Tammy and Shammy, and were originally placed before the propylon of an Amenopheion or palace-temple of Amenophis III. in this quarter, at Thebes. The easternmost of these colossi is the celebrated vocal statue, distinguished from its companion by having been anciently broken, and repaired from the lap upward with blocks of sandstone, placed horizontally, in five layers. The statue was either injured by Cambyses, to whom the Egyptian priests ascribed most of the mutilations of the Theban temples, or else thrown down by an earthquake. The peculiar characteristic of this statue was its giving out at various times a sound resembling the breaking of a harp-string or a metallic ring; and there have been different opinions as to the cause of this sound, which has been heard in modern times—it being ascribed to the artifice of the priests, who struck the sonorous stone of which the statue is composed; the passage of light draughts of air through the cracks; or the sudden expansion of aqueous particles under the influence of the sun's rays. This remarkable quality of the statue is mentioned first by Strabo, who visited it in

company of Ælius Gallus, about B.C. 18; and more than 100 inscriptions of Greek and Roman visitors incised upon its legs, record the visits of ancient travellers to witness the phenomenon, from the 9th year of Nero, A.D. 63, to the reign of Emperor Severus, when it became silent. Among other visitors whose names are recorded are those of Emperor Hadrian and his wife Sabina; Septimius Severus also visited the statue, and is conjectured to have restored it, for Juvenal mentions it as broken in half, and no notice of it occurs under the Pharaohs or Ptolemies. The identity of this statue and of M. is mentioned in the gloss upon Manetho, and by Pausanias and the inscriptions. Many considerations lead modern scholars to class the M. myth in close association with the worship of the sun.—Besides the mythical M., two historical personages of this name are known—one a Rhodian commander of the mercenaries of Artabazus in the war against Artaxerxes Ochus, who subsequently fled to Macedon, and afterward entering the Persian service, defended Persia against Alexander, B.C. 336; but finally died at the siege of Mitylene, B.C. 333: the other, a Greek historian, who wrote a history of Heraclea Pontica, in 16 books, epitomized by Photius.—Welcker, *Episch. Cycl.* 211; Strabo, xv. 728, xvii. 816; Ælian, *H. A.*, v. 1; Jacobs, *Die Graeber des Memnon;* Eusebius, *Hieron*, p. 154; Juvenal, xv. 5; Letronne, *Sur le Mon. d'Osymandyas;* Wilkinson, *Top. of Thebes*, p. 33; Vossius, *De Hist. Græc. à Westermann*, p. 226; Diodor. xvi. 52.

MEMOIR, n. *mĕm'wawr* [F. *mémoire*, memory—from L. *memŏrĭă*, memory—from *memor*, mindful]: a biographical history, generally written by one who had taken a part in the transactions recorded; a written account; a register of facts. MEM'OIRS, n. plu. *-wawrz*, notices and remarks respecting contemporary persons and events, written in a familiar style, just as they are remembered by the writer; a biography; the transactions and journals of a society. MEM'OIRIST, n. *-ĭst*, one who writes memoirs.

MEMORABLE, a. *mĕmŏ-ră-bl* [F. *mémorable*—from L. *memorābĭlĭs*, remarkable'from *memor*, mindful]: worthy-of being remembered;—illustrious; remarkable. MEM'ORABLY, ad. *-blĭ*. MEM'ORABIL'ITY, n. *-bĭl'ĭ-tĭ*, state of being memorable. MEMORABILIA, n. plu. *mĕm'ŏ-ră-bĭl'ĭ-ă* [L.]: things memorable; things remarkable and worthy of remembrance.—SYN. of 'memorable': signal; famous; distinguished; celebrated; extraordinary.

MEMORANDUM, n. *mĕm'ŏ-răn'dŭm*, MEM'ORAN'DA, *-dă*, or MEM'ORAN'DUMS, *-dŭmz*, n. plu. [L. *memoran'dum*, worthy of remembrance—from *memor*, mindful]: a note or notes to help the memory.

MEMORIA, n. *mĕ-mō′rĭ-a* [L.]: memory. MEMO′RIA-TECH′NICA, n. *-tĕk′nĭ-ka*, technical memory; a method for assisting the memory. See MEMORY.

MEMORIAL, n. *mē-mō′rĭ-ăl* [OF. *mémorial*—from L. *memorĭālis*, of or belonging to memory—from *memor*, mindful]: anything that serves to preserve the memory of; a monumental record; a written address of solicitation or complaint; a state paper or note in which there is neither subscription nor address—much used in negotiations. MEMO′RIALIZE, v. *-rĭ-ăl-īz*, to petition by memorial; to present a memorial to. MEMO′RIALIZING, imp. MEMO′RIALIZED, pp. *-īzd*. MEMO′RIALIST, n. *-ĭst*, one who presents a memorial.—SYN. of 'memorial': monument; memorandum; record; remembrance; petition; memento; remembrancer.

MEMORY: the term memory is an abstract name signifying the capacity for the renewal of an idea, and any concrete act of memory is 'the knowledge of an event or fact of which meantime we have not been thinking with the additional consciousness that we have thought or experienced it before' (James). Accordingly, it is a special case of the association of ideas and not an independent faculty of mind. The process of recognition implied in cases of true memory may arise from a clear image of the event remembered, or it may be due to a mere feeling of familiarity or to a motor response; it may also attach itself to the idea of an event not previously experienced, and in some cases of brain disease all events, new or old, appear as familiar experiences. Setting aside the factor of innate ability, which must account for the verbal memory of a Macaulay or the musical memory of a Mozart, we find that acts of memory are conditioned from without by factors of recency and repetition, and from within by vividness and by number of associate thoughts. The vividness, e.g. accounts for the greater retentiveness of childhood as compared with old age, and richness in associated ideas is the essential condition of a great logical memory like that of Herbert Spencer. These conditions may be most clearly understood by translating them into their physiological equivalents—a proceeding for which the intimate correspondence existing between aphasic and amnesic disturbances on the one hand, and definitely located brain disease on the other, gives full warrant. From this point of view the retention of an impression is not the pigeon-holing of an idea in some compartment of the mind, but a disposition towards the renewal of the excitation left behind by the original impression. This functional disposition is the stronger, and the more recent the impression the more intense its action (vividness) and the greater the number of times it has occurred. The condition of number of associates is correlated with a remarkable property of nerve-substance (i.e. organic memory), which is, that if several excitations take place in

the brain at about the same time, a recurrence of one will call up the rest and in their original order. It is this property which makes memory possible and with memory, experience. Accordingly memory has been termed cerebral habit. In this sense instinct, which may be regarded as functional disposition transmitted through heredity, has been called 'race memory.'

Exact experimental work on memory was first done by H. Ebbinghaus in 1883 or 1885. By eliminating the factor of vividness (interest) through the use of meaningless syllables, and subjecting large quantities of data to statistical treatment, he arrived at surprisingly accurate and regular results. He was thus enabled to show the forward and backward play of association in a series, together with its reach, the rate of forgetting and the proportional effect of repetition. Ebbinghaus's results have been confirmed by other investigators, and his methods have been found useful in experimentation on questions of applied psychology, such as economic ways of 'committing' material to memory and the effect of training one kind of memory on the efficiency of another kind. In the ordinary use of memory three main types of defects occur: (1) Specific items of past experience are forgotten, as when we cannot remember a street number; (2) the order of events is wrongly recalled, and (3) events are interpolated in memory which in reality never occurred. In disease of memory all one's images of a certain sort may be lost, e.g. one's visual memories. After an illness or a severe accident memory of the events occurring during the experience and much which went before may be lost. The words of a foreign language may be lost without serious disturbance of one's own language. In old age the brain loses its powers to take on new impressions and almost everything may be forgotten as soon as it is past, although the memory for earlier events remains fairly good. Consult Ebbinghaus, *Das Gedaechtniss* (*Memory*) (1885); W. James, *Principles of Psychology* (1899, Vol. 1, chapters on *Memory* and *Habit*); H. Burnham, *Memory, Historically and Experimentally Considered* in *American Journal of Psychology* (Vol. 2, 1888); Ribot, *Les Maladies de la Memoire* (*Diseases of Memory*, trans. 1882); J. J. van Biervliet, *La Memoire* (1901). See MNEMONICS.

MEM'ORY, DISEASES OF: impairment of the power of reproducing mental impressions, caused by age, wounds, or injuries to the head or nervous system, fevers, intemperance, and various physical conditions. Memory is perhaps affected in all kinds of mental derangement, but is in a signal manner obliterated or enfeebled in *Dementia*. There are, however, examples of recollection surviving all other faculties, and preserving a clear and extensive notion of long and complicated series of events amid the general darkness and ruin of mind. Incoherence owes some of its features to defective or irregular memory.

Cases of so marvelous an exaltation and extension of this capacity, as where a whole parliamentary debate could be recalled, suggest the suspicion of unhealthful action. There appear, however, to be special affections of the faculty. It may be suspended while the intelligence remains intact. Periods of personal or general history may elude the grasp, and even that continuity of impressions which goes far to constitute the feeling of personal identity is broken up, and a duality or multiplicity of experiences may appear to be conjoined. The converse of this may happen, and knowledge that had completely faded away may, under excitement or cerebral disease, return. There are, besides, states in which the power of memory is partially affected, as in the instances where the numbers 5 and 7 were lost, and where a highly educated man could not retain any conception of the letter F.; secondly, where it appears perverted, recalling images inappropriately, and in an erroneous sequence of order or time, and different from what are desired; thirdly, where, while the written or printed signs of ideas can be used, the oral or articulate signs are utterly forgotten.

MEMPHIAN, a. *mĕm'fĭ-ăn:* pertaining to *Memphis,* an ancient Egyptian city; dark; obscure.

MEMPHIS, *mĕm-fĭs:* Tenn., city, county-seat of Shelby county; on the Mississippi river, at the head of all-the-year-round navigation; on the Illinois Central, the Louisville & Nashville, the Yazoo & Mississippi Valley, the Kansas City, Memphis & Birmingham, the St. Louis & San Francisco, the Choctaw, Oklahoma & Gulf, the St. Louis, Iron Mountain & Southern, the Rock Island & Pacific, the Nashville, Chattanooga & St. Louis, the St. Louis & Southwestern, the Chicago, St. Louis & New Orleans, the Southern, the Memphis & Gulf, the Mobile, Jackson & Kansas City, and the Union railroads. It has steamer connection with all the river and gulf ports; 26 steamers call Memphis landing home. It is about 820 miles above New Orleans and 450 miles below St. Louis. It is the largest city in Tennessee, the fifth in size of the cities on the Mississippi river, and the most important place between New Orleans and St. Louis. It is noted for its extensive trade in cotton and cottonseed products and in hardwood lumber. It has the only bridge spanning the Mississippi river south of St. Louis. This is a steel cantilever bridge, 1,895 feet in length, costing $3,000,000, and opened to the public 1892, May 12.

Prior to 1880 Memphis was visited frequently by yellow fever, and in 1878 and 1879 passed through two terrible epidemics, losing about 5,000 of her population by death, and many thousand people left the city. This proved to be the turning point in her career, and since then 210 miles of automatic, flush-tank, Waring system of sewers have been put in. The water supply of the city is obtained from 64 artesian wells, the average depth

of which is about 400 feet. The present pumping capacity of the water supply is 30,000,000 gallons per day, and the daily consumption is 15,000,000 gallons.

The city is well laid out and well built. The wide, well-shaded and well-paved streets, the fine public and private buildings, the parks with numerous large trees, all make the city most attractive. The combined park area is about 1,000 acres, besides two fine race tracks. The streets are paved with asphalt, vitrified brick, macadam, and gravel. About 250 miles of turnpike radiate from Memphis. Among the 850 industrial establishments are 11 cottonseed-oil mills, 7 ice factories, 7 grain elevators, 35 wholesale grocery houses, 7 wholesale dry goods houses, 7 wholesale drug houses, furniture factories, woodworking establishments of all kinds, foundries, machine shops, flour mills, pulp and paper mills, fibre plants, saddlery and harness factories, potteries, car works, pump works, wagon and carriage shops, cracker and candy factories, patent medicine works, sugar plantation machinery works, barrel and skewer factories, spoke factories, golf stick works, shuttle block works, trunk, screen door, and window factories, basket and box factories, egg case works, horse collar factories, engine and boiler works, refrigerator and cold storage machinery works, cotton gins, stove and range factories, handle and coffin factories, shaft and pole works, cider presses, distilleries, and breweries.

Among the prominent buildings are 123 churches, 65 schools and colleges, 3 public libraries, 3 first-class theatres, the custom-house, cotton exchange, Odd Fellows' building, Porter, Scimitar, and Equitable buildings, Masonic Temple, Gayoso Hotel, Woman's building, Randolph building, Goodwyn Institute, Memphis Trust building, Tennessee Trust building, a number of fine hotels, 3 large hospitals, and 2 orphan asylums. Memphis has a number of educational institutions, good public and parish and many private schools, the Memphis Hospital Medical College, the Maddox School for Young Women, the College of the Christian Brothers (R. C.), founded in 1871; Saint Agnes' Academy (R. C.), Sacred Heart Institute (R. C.), Saint Mary's School (P. E.), University School, and 2 public high schools. The Hannibal Medical College and the Le Moyne Normal Institute are for colored pupils. Five miles distant from the city is a National cemetery, which contains 14,039 graves, of which 8,822 are those of unknown dead.

The annual expenditures for maintenance and operation are about $1,000,000. The combined capital and surplus of the 17 banks and 3 trust companies are $6,000,000; the deposits $25,000,000. The progress the city is making at the present time is almost phenomenal. The growth of Memphis during the decade from 1890 to 1900 was greater than in any former decade of its existence. The population increased nearly 59 per cent. In 1890

the city had 250 industrial establishments, in 1900 more than 650, and now has about 850. Memphis is often spoken of as not only the metropolis of Tennessee, but also of Arkansas and Mississippi; the city is located in such a position as to be a great trading centre for each of these states.

The history of Memphis begins almost with the history of the United States. It was a landing and tenting place for the early explorers and missionaries. It was the home of the Chickasaw Indians, and the bluffs on which the city is located, 40 feet above high water and 80 feet above low water, have always been known as the Chickasaw Bluffs. In 1698 the French built forts on the site of what is now the city, and in 1794 the Spaniards erected forts at a time when Spain was claiming exclusive rights to lower Mississippi. Some of the foremost men in the United States owned lands in this vicinity and were interested in holding for their own country a right to free navigation on the Mississippi to the Gulf. Andrew Jackson, James Winchester, and John Overton sent to Memphis, in 1819, a small colony, who established the first permanent settlement. In 1826 there were 500 persons in the settlement, which was then incorporated as a town, and in 1849 a city charter was granted. The Union and Confederate forces tried to gain possession of the city at the beginning of the civil war. In 1862, June 6, a Federal fleet under Commodore Davis conquered a Confederate fleet under Commodore Montgomery, thus placing Memphis in possession of the Union forces. General Forrest, in command of Confederate forces, entered the city in August, 1864, and took several hundred prisoners.

Memphis has always progressed commercially except during the civil war, and when visited by the yellow fever epidemics. The great growth industrially has come within the last few years. The location is making the city a great railroad centre; the surrounding forests are making it a great industrial centre; and the alluvial lands of the Saint Francis Basin, Yazoo Delta, and the valley of the Mississippi river will always make her a great commercial centre. In 1855 yellow fever attacked the city, and again in 1867, 1873, 1878, and 1879. The epidemics of 1878 and 1879 so paralyzed the industries of the city that in 1879 Memphis was unable to liquidate the current indebtedness and the charter as a city was revoked. The former city was designated by the state legislature as 'the taxing district of Shelby county.' The control of the district was vested in a board of public works composed of five members, and a governing council composed of three commissioners. The council instituted the sewerage improvements, liquidated the debts, and in 1891 the place was reincorporated and again chartered as a city. Memphis lost lives, property, trade, and credit; but the history of the deeds of heroism per-

formed by many during the fearful yellow fever epidemic overshadows in importance the history of financial difficulties.

Since the federal census of 1890 the city limits have been extended; but the population as given in 1890 included both urban and suburban districts, and the increase from 1890 to 1900 was remarkable. The growth of the city may be seen from the federal census reports. Pop. (1860) 22,623; (1870) 40,226; (1880) 33,592; (1890) 64,495; (1900) 102,320; (1910) 131,105.

MEMPHIS: celebrated Egyptian city, in the Delta, or Lower Egypt; cap. of the ancient Egyptian empire. It was called by the Egyptians *Men nefer*, 'the Good Station'; by the Hebrews, *Moph;* by the Arabs, *Memf.* Memphis is mentioned in the Old Testament, as Moph (Hos. ix. 6); and as Noph (Is. xix. 13; Jer. ii. 16; Ezek. xxx. 13, 16). It was founded by Menes (q.v.), first monarch of the first dynasty, who, according to Herodotus, changed the bed of the Nile, and made an embankment, 100 stadia (a stadium = 606 ft. 9 inches) above Memphis, to protect the new city against inundations. The remains of this bank are still seen at Kafr-el Tyat, about 14 m. above Metrahenny, which is the centre of old Memphis, and the site of the temple of Ptah or Hephæsteum. Menes fortified the city, and laid the foundations of the temple. Uchoreus, a later monarch, also is said, according to some traditions, to have founded Memphis, and introduced the worship of Apis and Epaphus. The site of the city was well chosen, protected alike by the Libyan and Arabian chains of mountains against the river and the incursions of the sand, defending the approach of the country from the incursions of Asiatic nomads, and communicating with the Red Sea and the Mediterranean. The city was composed of two portions—one built of crude bricks; the other, on which was the citadel, of calcareous stone, called the *Leukon Teichos*, or 'White Wall,' which held some of the principal buildings. The palace, built by Menes, was enlarged by his son Athothis, and was always inhabited either by a monarch or his viceroy. Under the Persian rule, it was occupied by the satrap; and by the Greek mercenaries, under the Saite kings. Under Uchoreus, the total circumference was 150 stadia. After the 6th dynasty, the city declined in importance, and was apparently held by the Hykshos after the 13th and before the 18th dynasty (B.C. 1500). At this period, Memphis was ruled by a viceroy, a prince of the blood, and still remained the religious capital of the old worship. It rose again to great importance under the Saite monarchs, about B.C. 600, who restored it; it became the seat of a separate monarchy, and was conquered by Sennacherib and his successors. The temples were magnificent, and comprised the Iseum, a large temple of Isis, completed by Amasis II. just prior to Cambyses, B.C. 525; a temple dedicated to Proteus, in the

foreign quarter; the temple of the Apis, having a peristyle and court ornamented with figures, opposite the south propylæum of the temple of Ptah, where the sacred bull resided; the Serapeum, or temple of Os or Apis, in the quarter recently discovered by Mariette (see SERAPEUM); the Nilometer, removed by Constantine I. to Constantinople, replaced by Julian III. or the Apostate; a temple of Ra; and the shrine of the Cabiri. Here were the statues of Rameses II., one of which remains as the fallen colossus, Metrahenny; and others have been discovered by Hekekyan Bey in his excavations. These colossi, more than 75 ft. high, were of Syenitic granite, or of the limestone of Tourah or Mokattan. These temples flourished in all their glory till the Persian conquest. Still more remarkable was the great necropolis of the city, in the centre of which towered the pyramids (see PYRAMIDS). During the attempts of the native rulers to throw off the Persian rule, Memphis was an important strategic point. Ochus inflicted severe injury on this town, having plundered the temples and thrown down the walls after he had driven out Nectanebus. Alexander the Great here worshipped the Apis, and his corpse was brought to this city by Ptolemy before it was finally transferred to Alexandria. The first Ptolemies were crowned in the Serapeum. Ptolemy VIII. destroyed the city, and it had so declined after his time as to become a ruinous site. It fell with the rest of Egypt under the Roman rule, and afterward was conquered by Amru Ben Abas A.D. 639-640; and Fostat and Cairo were built out of its ruins, which were large and important in the 13th century, when they were seen by Abd-alatif. The few remains of the ancient city are Koum-el-Azyzeh to the n.; Metrahenny on the w.; and the canal of Bedrachin on the s.; but the remains here are submerged many feet in the soil of the Delta.

Herod. ii. 97, 101, 147, 178; Diod. xviii. 34, i. 46, Fragm. t. 33, lvi. p. 184; Thucyd. i. 104; Hygin. xiv. 90; Heliod. ii. 59, 61; Hosea ix. 6; Isaiah xix. 30; Ezek. xxx. 13, 16; Wilkinson, *Top. Thebes;* Bunsen, *Egypt's Place;* Champollion-Figeac, *L'Egypte;* and the works on Egypt of Lepsius, Brugsch-Bey, Ebers, Rawlinson, Maspero, and others.

MEMPHREMAGOG, *mĕm-frė-mā'gŏg,* LAKE: body of water partly in Canada, partly in Orleans county, Vt.; length n. to s. about 30 m., width 2 to 5 m. Through Magog river its waters flow into the St. Francis, which empties into the St. Lawrence. It has good fishing facilities and is surrounded by picturesque scenery, and at its s. end at Newport, Vt., there are large hotel accommodations for summer visitors: from this point steamers run to the village of Magog, Can., at the n. outlet.

MEN: plu. of MAN, which see.

MEN, THE: in n. Scotland, where Gaelic is still spoken, a remarkable class of irregular yet recognized religious

exhorters, forming practically an order correspondent to Meth. local preachers. The Men pass gradually into the order, according to reputation for piety and gifts in prayer and exhortation. There are often three or four in a parish; and on Friday preceding a communion, the men, attired in long blue cloaks, gather from adjoining parishes—sometimes numbering a score or more—and exercise their gifts. In the deficiency of regular ministers for scattered villagers, the men have done good service and have had great influence among the people. The rise of the Free Church increasing the ministerial supply in the Highlands, has largely diminished both the need and the influence of this order.

MENABREA, Luigi Federigo, Count: Italian soldier and statesman: b. Chambéry, in Savoy, 1809, Sept. 4; d. there 1896, May 25.—After completing a course in mathematics at the University of Turin and joining the engineers in the Sardinian army, he accepted the professorship of technical science at the military academy and at the University of Turin. Having been promoted to the rank of captain, he was used in the diplomatic corps for some time; was then elected deputy, serving both under the minister of war and the minister of the interior; and upon the outbreak of the war of Sardinia and France against Austria in 1859 he was appointed chief of the engineer corps. After Savoy was ceded to France, Menabrea was made a senator by Victor Emmanuel, and chief of the department of engineers, and as such planned the fortifications of Bologna, Piacenza, and Pavia; in 1860 he was created a lieutenant-general, in that year laying siege to and after three months of fighting taking Gæta. In 1861 he joined the cabinet of Ricasoli as minister of marine, in 1862 also taking over the portfolio of minister of public works. In 1866 he was Italian ambassador to the council which brought about the Treaty of Prague and ceded Venice to Italy. In 1867, when Rattazzi resigned, he formed a new ministry, himself becoming minister of foreign affairs. As premier he did much to place Italy in cordial relations with the outside world, and to settle internal dissensions, but his imprisonment of Garibaldi, and the prevalent financial straits of the nation lost to him the confidence of the House of Deputies, and on Nov. 16, 1869, he resigned. In 1870 he became Italian ambassador at Vienna, was appointed to the same post at London in 1876, and in 1882 went to Paris, where he was stationed for 10 years. The most important of his works are: *Etudes sur la série de Lagrange* (Turin 1844-47); *Le genie italien dans la campagne d'Ancone et de la Basse-Italie* (Paris 1866); and *République et Monarchie dans l'état actuel de la France* (1871).

MENACCANITE, n. *mĕn-ăk'kăn-īt* [from *Menaccan*, Cornwall, where first observed]: a titaniferous iron ore,

occurring massive and in grains, of a light iron-black color.

MENACE, n. *mĕn'ās* [F. *menace;* It. *minaccia,* a threat —from L. *minācĭæ,* threats]: a threat; a threatening: V. to threaten, in any sense; to inspire with apprehension. MEN'ACING, imp. *-ă-sĭng:* ADJ. threatening: N. a threat. MEN'ACED, pp. *-āst.* MEN'ACINGLY, ad. *-lĭ.* MEN'ACER, n. *-ă-sẽr,* one who threatens.

MENADO, *mė-nâ'dō:* important possession of the Netherlands, on the n. of the island of Celebes (q.v.): it is under the government of the Moluccas. The country is volcanic with many lofty mountains. The mountainous grounds of the province of Minahassa are well adapted for the growth of coffee, which was first planted 1820, and speedily became favorably known in the market. The coffee-culture is compulsory, and the government monopolizes the product at a fixed price. There are about 11,000,000 coffee-trees, producing more than 1,000 tons per annum. The rice crop averages 47,880 tons. There are 400,000 sago and 800,000 cocoa-nut trees, and cacao, tobacco, cotton, and cinchona are cultivated. In this residency, civilization and Christianity have made rapid progress. Twenty years ago, the pagans were most numerous in the Minahassa district, but many thousands are now Christians.—The town of Menado is neatly built, has a church, a school for the children of Europeans, and others for those of natives.—Pop. (1900) about 295,000.

MENAGE, *mā-nâzh',* GILES DE, or ÆGIDIUS: French lexicographer and linguist: 1613, Aug. 15—1692, July 23; b. Angers. Disliking the profession of an advocate, he renounced it, with an office under government, which his father had transferred to him, entered the priesthood, and fixed his residence in the convent of Notre Dame, applying himself chiefly to literary pursuits, in which he acquired great reputation. He was an extreme pedant, full of prejudices and bitter hostilities. His *Dictionnaire Etymologique de la Langue Française* (Par. 1650; best ed. by Jault, 2 vols. Par. 1750), and *Origini della Lingua Italiana,* are erudite and valuable works, though they give many erroneous etymologies.

MENAGERIE, n. *mĕn-âzh'ėr-ĭ* or *mĕn-ăj'ėr-ĭ* [F. *ménagerie,* a place for keeping foreign animals—from *ménage,* a house, a family]: a collection of foreign and wild beasts; the place where they are kept; also spelled MENAG'ERY, n. *-ĕr-ĭ.*

MENAI STRAIT, *mĕn'ī:* separating the island of Anglesey from the mainland of Wales, runs e.n.e. from its southern extremity to Bangor, 13 m., and there widens into Beaumaris Bay. Its width varies from about 250 yards to 2 m. The navigation is hazardous, but the strait is nevertheless much used for the sake of expedition by vessels under 100 tons, and occasionally

by some of larger size. At the entrance of the strait, the tides sometimes rise 30 ft., and the ordinary neap-tide rises 10 to 12 ft. Communication between Anglesey and the mainland was formerly maintained by ferry-boats at different points; but a suspension bridge was constructed by government in the line of the great Holyhead road, and subsequently railway communication was established by means of the Britannia Bridge. The scenery on both sides of the strait is mildly beautiful.

MENANDER: the most famous writer of the New Comedy at Athens: b. at Kephisia, in Attica, 342 B.C. His father was an Athenian general, Diopeithes; his maternal uncle was the comic poet Alexis. To his influence Menander was greatly indebted. Greece was under Macedonian sway. Demetrius of Phalerum, the ruler of Athens, was his intimate friend. He was also intimate with Theophrastus, the author of the 'Character Sketches,' and the pupil and successor of Aristotle. To him Menander owed much in his character-drawing, while in the subtler suggestions of philosophic thought he was debtor both to him and to Epicurus, another close contemporary and friend. He was drowned, as tradition reports, while bathing in the Piræus harbor in 291 B.C. But although his life was short he wrote more than a hundred comedies. Until recently these were known only by about 1,050 fragments, varying in length from a few words to nineteen lines. His fame, however, which greatly increased after his death, has always been secure. Terence in his comedies made large use of Menander and the two have always been paired together since Julius Cæsar called Terence a 'halved Menander.' Menander's skill in portraying character led Aristophanes of Byzantium to exclaim: 'O Menander, O Life, which of you copied the other?' Dio Chrysostom and Plutarch rated Menander even above the greatest of Greek comic poets, Aristophanes himself. Quintilian recommended his comedies as the best reading for the incipient Roman orator. The New Comedy reflected contemporary political conditions. Under the rule of Macedon the Athenians relaxed into the inertia of material prosperity. Biting political or personal satire was out of the question The Comedy of Manners became established. Euripides had paved the way for the romantic and pathetic element in literature and Menander followed his lead, substituting, however, a more urbane philosophic outlook such as Theoprastus and Epicurus were popularizing. The grossness of Old Comedy is happily absent. Romantic passion asserts its hegemony. The intrigue is the order of the day. But emphasis is laid rather upon character-drawing than upon the plot. Hence the rather monotonous round of plots known to us both from the translations or adaptations of Terence as well as from the remains of Menander's own writings. The usual programme is a love-affair, separation, recog-

nition, marriage. Sharp shrews; pompous papas; mistresses; devotedly deceitful slaves; headstrong young men; a maiden carried off into servitude or left destitute and apparently orphaned until her father turns up as the intimate friend of the father of her lover; parasites; panderers; money-lenders—all in generous profusion, while the more respectable members of society exist chiefly by inference in the background. The New Comedy, in fact, no longer offers the lyric beauty, the sparkling wit, the naked license of Aristophanes. It does not, indeed, primarily seek to provoke laughter, but is the scenic representation of human life, the pathetic, the amusing, and the commonplace. The finds of Greek papyri during the last 17 years in Egypt have greatly increased our first-hand knowledge of Menander and enable us now to re-examine the traditional verdict inherited from antiquity. Between 1891 and 1903 four fragments were found, containing 14, 51, 60 and 87 lines, respectively, of three comedies: *The Flatterer; The Countryman;* and *The Girl Who Gets Her Hair Cut Off.* The latest find, however, is of far greater importance. In 1907, Dec., was published (at Cairo) a fine quarto which restored to us portions of four comedies. Of these two are comparatively short fragments. *The Hero* (title inferred) yields only 71 lines. It preserves, however, the argument and the *dramatis personæ.* The plot is typical except that here, instead of one infant exposed, there are twins and the girl grows up to repeat her mother's fate. There is the usual happy solution—a 'recognition' of the children and the original couples married before, or after, the dénouement.

The Girl Who Gets Her Hair Cut Off (*Perikeiromene*) contains only 178 verses, but there are 51 additional lines in the fragment found in 1899 (see above). The first scene is lost. A brother and a sister have been abandoned as infants and brought up separately in ignorance of their parentage. The sister comes to know the facts, but her brother, still in ignorance, excites the jealousy of her lover, who in a rage cuts off her hair. Hence the name of the play. The latter becomes duly repentant. Glycera finds her father by means of the tokens exposed with her (as was usual) when a baby. She forgives her barber of a lover and is given to him in marriage by her father.

Those Submitting to Arbitration (*The Epitrepontes*) is the most complete. The 525 lines preserved enable us to judge of Menander in continuous scenes. Fortunately, as we know from several sources, this was one of his most famous plays. Quintilian (Inst. x. 70) cites with enthusiasm the *Epitrepontes* (with five others: *Epiclerus; Locroe; Psophodees; Nomothetes; Hypobolimacus*). In this arbitration scene, therefore, we doubtless have preserved one of the very models recommended to his students in oratory by the great Latin writer.

The scene in question will show that Quintilian's praise is not excessive. The characters of the shepherd Daos and the charcoal-burner Syriskos are drawn to the very life as they make before old Smikrines, the arbitrator, their respective pleas for the possession of certain trinkets found exposed with a baby. Although this scene gives the name to the play it is only an incident. There is one of the usual plots. All the characters are admirably drawn and the narrative of the first encounter of the hero and heroine, at the night festival of the Tauropolia, is vividly dramatic.

The fourth play, *The Samian Woman* (title inferred), contains a greater number of lines (567), but it is less consecutive. The scenes, however, are very dramatic and throw many side lights upon domestic life. In one scene Demeas in his country house busies himself personally in the store-room with laying out provisions for his son's wedding-feast. The interior of a Greek house is described incidentally and he overhears an old nurse telling tales out of school while fondling a certain adopted baby. Later we are introduced to the Cook-and-Butcher, who, like a modern caterer, comes with his crockery, food and servants to take charge of the function.

The Greek itself of Menander is easy and lucid. All this, while confirming Menander's great reputation, increases our regret for the other lost plays. To fill out our knowledge of the New Comedy we must still turn to Terence, but to complete our estimate of Menander himself we gain even more by a careful study of the old short fragments. These were preserved largely on account of their philosophic content, their criticisms on life, sometimes caustic, often humorous and prevailingly optimistic. Many are exceedingly beautiful and, as it happens, the new finds give scarcely any repetition of just this material. The contents of these older fragments would tally well with the impression given by the seated statue in the Vatican, long regarded as a portrait of our poet, but now rejected as a false identification.

For the old fragments and titles of lost plays see Meineke's and Kock's editions of the Comic Fragments. For the finds of 1891-1903 see *ed. princ.* of *Countryman,* by Nicole (Geneva 1897), and Grenfell & Hunt (Oxford 1898) and Ox. Pap. (London II., 1899; III., 1903).

Translations: Symonds, *Greek Poets,* cap. XIX., two fragments; Paley translates a number of fragments. For translation of the 'Arbitration' scene (*Epitrepontes*) with extracts from *The Samian Woman,* some of the old fragments and an account of the Egyptian finds, see New York *Nation,* 1907, Mar. 19. For the latest finds: *Ed. princ.,* Lefebvre (Cairo 1907) and J. Van Leeuwen (Leyden 1908).

MENANDRIAN, n. *mĕ-năn'drĭ-an:* in *chh. hist.,* follower of Menander, disciple of Simon Magus, who to all his master's heresies, added this of his own: that without baptism in his name salvation was all impossible,

and to all so baptized he promised immortality and incorruptibility.

MÉNARD, *mā-nâr*, MICHEL BRANAMOUR: American pioneer: b. Laprairie, Lower Canada, 1805; d. 1856. He was of French parentage, and after working some time for a Detroit fur-trading company entered the service of his uncle, also a fur-trader, in Missouri. The Shawnees made him their chief, and he acquired great power among the various Indian tribes. Soon after 1830 he went to Texas, where he continued fur-trading with the Indians, and also dealt with the Mexicans. When the Texans revolted against Mexico he held the Indians in check and kept them from acting against the insurgents. As a member of the convention at which the Texans declared their independence, and afterward of the Congress of Texas, he exerted an influence in the formation of that state. The greater part of the site of Galveston was included in a purchase made by him in 1836, and of that city he, more than any other man, is to be considered the founder.

MENASHA, *mē-năsh'a:* city in Winnebago co., Wis.; at the mouth of the Fox river, on Lake Winnebago, on the government canal of the Fox and Wisconsin River Improvement Company, and on the Chicago, M. & St. P., the Wisconsin C., and the Chicago & N. W. railroads, about 90 m. n. by w. of Milwaukee. The first permanent settlement was made in 1847 and the incorporation was in 1874. Menasha, like other places on Lake Winnebago, is a favorite summer resort. It is in an agricultural region in which the lumber interests are prominent. The chief manufactures are flour, lumber, paper, brick, machine-shop products, woodenware, furniture, and woolen goods. The city has good public and parish schools, and a public library. Pop. (1890) 4,581; (1900) 5,589; (1910) 6,081.

MEN'CHIKOFF, or MEN'CHIKOW. See MENSHIKOFF.

MEN'CIUS. See MENG-TSE.

MEND, v. *mĕnd* [L. *emendārĕ*, to correct—from *menda*, a blemish: It. *rimendare;* Milanese, *menda*, to mend clothes]: to repair, as a defect or injury; to set right; to rectify or correct; to improve or make better; to hasten, as the pace; to grow better. MEND'ING, imp.: ADJ. repairing; improving: N. the act of repairing. MEND'ED, pp. MEND'ER, n. *-ĕr*, one who mends.—SYN. of 'mend'; to improve; better; emend; help; correct; amend; reform; rectify.

MENDACIOUS, a. *mĕn-dā'shŭs* [L. *mendācĭŭm*, a falsehood—from *mendax*, lying: It. *mendacio*, falsehood]: false; lying. MENDA'CIOUSLY, ad. *-lĭ*. MENDAC'ITY, n. *-dăs'ĭ-tĭ*, deceit; falsehood; lying.

MENDÆ'ANS, or MANDÆ'ANS: name for CHRISTIANS OF ST. JOHN (q.v.).

MENDA'NA ISLANDS. See MARQUESAS.

MENDEL, JOHANN GREGOR: abbot of Brünn, now known as the discoverer of the law named after him (see HEREDITY); b. Heinzendorf bei Adrau, Austrian Silesia, 1822, July 22, of peasant parents; d. 1884, Jan. 6. In 1843 he entered the Königinskloster, an Augustinian foundation in Altbrünn, as a novice; and was ordained priest in 1847. From 1851-53 he studied natural science at Vienna; and, on his return to the cloister, taught in the Realschule. About 1869 he became abbot of Brünn; and later took part in the Ultramontane movement. It was in 1854 that he began those experiments, on *Pisum*, in the cloister gardens, that, after the lapse of half a century, have brought him posthumous fame. In 1865 he contributed his now memorable paper, *Versuche über Pflanzenhybriden*, to the Society of Naturalists of Brünn; and, in 1869, another, on *Hieracium* hybrids. After 1869 he seems to have discontinued his work in hybridizing. He called himself a student of Kollar; and for some time he was president of the Brünn society. His experiments have since been verified, simultaneously, in 1900, by De Vries, in Holland, Correns, in Germany, and Tschermak, in Austria, and a translation of his paper appeared in the 'Journal of the Royal Horticultural Society of England' (1901).

MENDELÉEFF, *měn-dyĕ-lā'yĕf*, DIMITRI IVANOVITCH: Russian chemist: b. Tobolsk, Siberia, 1834, Feb. 7; d. St. Petersburg 1907, Feb. 2. He studied at the Institute of Pedagogy, St. Petersburg, where he gave special attention to natural science; in 1856 became docent at the University of St. Petersburg; was at Heidelberg in 1859-61, where he published his monograph *On the Capillarity of Gases*, soon followed by *Organic Chemistry*. In 1863 he became professor of chemistry at the St. Petersburg Institute of Technology, and in 1866 was appointed to a similar professorship in the University of St. Petersburg. The results of his researches on the compression of gases, which he closely pursued from 1871 to 1875, were set forth in his work *On the Elasticity of Gases*. He was commissioner in 1876 to report upon the petroleum industry in the Caucasus regions and in Transylvania. His *Aqueous Solutions* (1886), a work on experimental chemistry, has taken its place among the most important contributions to that branch of science. In 1890 his *Tariff Elucidated* presented the protectionist views of which he had already become a well-known advocate, and which, as a member of the Council of Commerce and Industries, he actively propagated. When the Chamber of Weights and Measures was established by the Department of Finance, in 1893, he was appointed conservator of the weights and measures. His proof of the periodic law, first presented in *Elements of Chemistry* (1868-70), is his crowning achievement in pure science. Consult: Thorpe, *Essays in Historical Chemistry* (1894).

MENDELSSOHN, *měn'dĕls-sōn*, Moses: eminent German philosopher: 1729, Sep. 6—1786, Jan. 4; b. Dessau on the Elbe. From his father, a Jewish schoolmaster and scribe, he received his first education; and in his 13th year went to Berlin, where, though very indigent, he contrived to learn Latin and modern languages, and to apply himself to philosophy, into which early readings, chiefly of Maimonides's *Moreh Nebuchim*, had initiated him. After many years of comparative indigence, he became partner of a rich silk-manufacturer, whose children he had educated. M. was the intimate friend of Lessing, and an associate with men like Sulzer and Nicolai; and he directly and indirectly contributed in a vast degree to remove the brutal and vulgar prejudices against the Jews, and the disgraceful laws concerning them. On the other hand, he acted in the most beneficial manner on his own co-religionists, by rousing them from the mental apathy with which they regarded in his day all that had not a distinct reference to religion, and by strongly combating their own religious and other prejudices. On account of his immense influence upon them, he was called another Moses. His principal works are—*Pope, ein Metaphysiker* (with Lessing) (Dan. 1755); *Briefe über die Empfindungen* (Berl. 1764); *Ueber die Evidenz der metaphysischen Wissenschaften*, a prize essay of the Berlin Acad., which thereupon unanimously resolved to elect him a member of their body; Frederick the Great, however, generally prejudiced against the Jews, struck his name off the list; *Phaedon, oder über Unsterblichkeit der Seele* (Berl. 1767), dialogue in the manner of Plato; *Jerusalem, oder über religiöse Macht des Judenthums* (Berl. 1783), chiefly in answer to Lavater's obtrusive, sometimes even offensively worded arguments, by which he intended to convert M. to Christianity, or to prove that he was a Christian already. Further, *Morgenstunden* (Berl. 1785): Morning Conversations with his children and friends, chiefly in refutation of Pantheism and Spinozism. Besides many other smaller Hebrew and German essays, contributions to the *Bibliothek der schönen Wissenschaften*, edited by Lessing (to whom, in a manner, he furnished the prototype to his *Nathan der Weise*), etc., his translation of the Pentateuch and the Psalms has prominent place. His works were edited 1845, and again in 1880 (8 vols.).

MENDELSSOHN-BARTHOLDY, *měn'dĕls-sōn-bâr-tol'-dē*, Felix (Jakob Ludwig Felix): German musical composer: 1809, Feb. 3—1847, Nov. 4; b. Hamburg; son of Abraham M.-B., eminent banker, and grandson of Moses Mendelssohn, philosopher. His father was a convert to Christianity, and young Felix was brought up in the Lutheran faith. The affluent circumstances of his parents enabled them to give him a most liberal and careful education. His fine genius early showed itself. Zelter was his instructor in composition, Ludwig Berger on the piano. In his ninth year, he gave his first public concert in Berlin, and in the following year played in Paris. From this period, he commenced to write com-

positions of all sorts, some of them very difficult, for the piano, violin, violoncello, etc. In 1824 the first of these —three quartets for the piano—were published. In 1825 he went a second time to Paris—his father, on the advice of Cherubini and other eminent artists, having consented that he should devote himself exclusively to music. He then gave concerts both in Paris and Berlin, after which he travelled for three years in England, Scotland, France, and Italy. In England he obtained enthusiastic applause by his overture to Shakespeare's *Midsummer Night's Dream*, which, in its blending of the fanciful, the delicate, and the grotesque, is said to have caught the inspiration of Shakespeare himself. It reveals originality, freshness, technical mastery, and is usually assigned the highest rank among modern musical compositions. He afterward wrote music to accompany the whole play. His *Isles of Fingal* are a fine memorial of the impression left on him by the wild scenery of the Western Highlands. His letters from Italy also show how profoundly he was affected by that land—the ancient home of art. M. subsequently attempted to start a musical theatre for the cultivation of high art, at Düsseldorf; but it did not succeed. In 1835 he accepted the directorship of the Leipzig concerts. Here he was in the centre of the musical world of Germany, and was stimulated to his highest and most brilliant efforts; yet it was in England that M. first met a reception proportionate to his genius. His oratorio *St. Paul*, after being performed at Dresden and Leipzig, was produced under his own management at the Birmingham festival, 1837, Sep. 20, and created quite a furor. It and his other oratorio *Elijah*, on which he labored nine years, and which was brought out first at the Birmingham festival of 1846, are reckoned his two greatest works. His ten visits to England exerted an educational influence on musicians in that country. He died at Leipzig. Among his best-known compositions are his music for Goethe's *Walpurgisnacht*, the *Antigone* and *Œdipus* of Sophocles, *Athalie*, and a great number of splendid sonatas, concertos, trios. In his *Lieder ohne Worte* (Songs without Words), he achieved a great and novel triumph. M.'s character, which was even finer than his genius, is charmingly delineated in his *Letters*, translated by Lady Wallace (1862). In society he was brilliant and charming; he was amiable, generous, sympathetic, and in his friendships unswervingly true. His marriage 1837 was in every respect happy. See Hensel's *The Mendelssohn Family* (transl. 1881).

MENDICANT, n. *mĕn'dĭ-kănt* [F. *mendiant*, a beggar —from L. *mendicans* or *mendican'tem*, begging—from *mendīcus*, needy: It. *mendicante*]: specifically, one of a religious fraternity in the R. Cath. Chh. who originally lived by begging; a friar: in general, beggar: see BEGGAR: VAGRANTS: POOR, THE: ADJ. begging; practicing beggary—applied to several religious fraternities in the R. Cath. Chh. (see MENDICANT ORDERS). MEN'DICANCY, n. *-kăn-sĭ*, a state of begging; beggary. MENDICITY, a.

mĕn-dĭs'ĭ-tĭ [F. *mendicité*—from L. *mendicĭtātem*, extreme poverty]: pertaining to beggars; for assisting beggars, as *mendicity* society: N. the life of a beggar; the state of begging.

MEN'DICANT ORDERS: religious associations in the Roman Church, which, carrying out the principle of religious poverty and self-humiliation to its fullest extent, make it a part of their profession to denude themselves of all property, whether real or personal, and to subsist on alms. As the scriptural foundation of this practice, the words of our Lord (Matt. xix. 21) to the rich young ruler who sought counsel of him, and again (verses 27–30) to his own disciples, are commonly alleged, both by the M. O., and in general by all who profess what is called evangelical poverty. In the M. O., alms are commonly collected by the lay-brothers: in some, by actual solicitation; in others, by the ringing of the convent bell when the stock of provisions is exhausted. Formerly, such orders were numerous in the church; but by a decree of the second Council of Lyon 1274, the M. O. were limited to four—Dominicans, Franciscans, Carmelites, and Augustinians or Austin Friars. (See these titles: also FRIARS.) The rule by which individuals are denied the possession of even personal property is understood strictly in Rom. Cath. countries. In England and Ireland, it was considerably relaxed, but of late years has been enforced with increasing exactness.

MENDIP HILLS, *mĕn'dĭp:* range in the n. part of Somersetshire, England, extending n.w. and s.e.; about 25 m. long, by 3 to 6 m. in breadth. In former times, the moors of Mendip were attached to the crown as a royal forest, and were frequently hunted over by the Saxon and Norman kings. A considerable portion of the range is now under cultivation. The summit is Black Down, 1,100 ft. The lead and calamine mines of Mendip (called *grooves*, the miners being called *groovers*) were in operation before the dawn of history.

MENDOTA, *mĕn-dō'ta:* thriving city and railroad junction, forming the business centre of Mendota township, La Salle co., Ill.; on a rolling prairie 84 m. w.s.w. from Chicago. It has ten churches, several excellent schools, a Lutheran college, two newspapers, three banks (one national), and a public library. The leading manufacturing interests are an organ factory, iron foundry, flouring mills, and carriage shops. Pop. (1880) 4,142; (1890) 3,542; (1900) 3,736; (1910 est.) 3,900.

MENDOZA, *mĕn-dō'za*, Sp. *mĕn-dō'thâ:* capital of the dept. of M. in the Argentine Republic (q.v.); on the e. base of the Andes, 110 m. e.n.e. of Santiago, 2,891 ft. above sea-level. It was a well-built town, but was totally destroyed by an earthquake 1861, when its buildings were demolished, and abt. 12,000 of its 15,000 inhabitants perished; but it has been rebuilt on a new site, and is rapidly growing. Pop. (1901) 29,500.

MENDOZA, *měn-dō′za*, Sp. *měn-dō′thâ*, Antonio de, Viceroy of Mexico: 1495–1552, July 21; b. Granada, Spain. 1535, Apr. 17, he was appointed viceroy of Mexico by Charles V., and was the first and most famous of the series of 64 such officers. He effected many beneficent reforms, especially mitigating the condition of the Indians. In 1536 he imported into the city of Mexico the first printing-press brought to America; established a mint for coining money; 1537, founded the first college in the country; promoted agriculture, and developed the mineral resources of the land. He repressed an Indian revolt without unnecessary severity; and, 1551, was made viceroy of Peru, where he died at Lima.

MENDO′ZA, Don Diego Hurtado de: Spanish classic author, distinguished also as statesman and general: abt. 1503–1575, Apr.; b. Granada. After studying there and at the Univ. of Salamanca, he was sent by Emperor Charles V. as ambassador to Venice. Later, he was present at the Council of Trent as imperial plenipotentiary, and 1547 was appointed ambassador to the papal court. As a general, he was successful in subjugating Siena, which was transferred to Cosmo I. Medici, as a fief of the Spanish crown. His position, however, was a difficult one; he was hated both by pope and people, and 1554, the emperor recalled him. During his residence in Italy, he showed great zeal in collecting literary treasures, especially ancient mss. He sent learned men for that purpose to Mount Athos, and also took advantage of the regard entertained for him by Soliman the Magnificent, Sultan of Turkey. In 1568 an affair of gallantry terminated in his banishment from court. He withdrew to Granada, where he spent his last years in writing his *Guerra contra los Moriscos* [History of the War against the Moors—first published (with parts omitted) 1610, and complete 1776, by Portalegre, who prefixed a life of the author]. This work is regarded by M.'s countrymen as a masterpiece. His library is now one of the ornaments of the Escurial. In his poetical epistles, he gave his country the first good model for that form of composition. His sonnets and serious poems are inferior.

MENDO′ZA, Iñigo Lopez de, Marquis of Santillana: 1398–1458, March 26; b. Spain; son of the grand admiral of Castile, who died while M. was a child; whereupon the ruling nobles of the kingdom seized his vast family estates. M., however, recovered them either by law or in combat before he had attained his majority. He commanded an army successfully against the Moors; defeated the Aragonese at Araviana and in the defense of Alcalá; and was made marquis after the battle of Olmedo. He turned from the internecine struggles and political plots of the court and kingdom, after the fall of Alvarado de Luna, and occupied himself in literature. Inheriting poetic tastes from his grandfather, Pero Gonzalez M., he wrote much, but was notable rather as pa-

tron and protector of other poets. He was an imitator of Dante, and of Italian and Provençal poetry in general; and introduced into Spain the sonnet and allegory in poetical composition. His best-known poetical works are the *Comedieta de Ponza;* and popular proverbs, or *Refranes*, in 100 rhymed sentences. Much of his poetry remains unpublished. He died at Guadalajara.

MENDS, n.: in *OE.*, for AMENDS, which see.

MENELAUS, *mĕn-ē-lā′ŭs:* in ancient Greek legend, king of Lacedæmon. He was younger brother of Agamemnon, and husband of the famous Helen. The abduction of his wife by Paris is represented as the cause of the Trojan war. After the fall of Troy, he sailed with Helen for his own land; but his fleet was scattered by a storm, and he wandered for eight years about the coasts of Cyprus, Phœnicia, Ethiopia, Egypt, and Libya. After his return, he lived at Sparta with his wife Helen in great happiness; and the legend proceeds to the effect that, as son-in-law of Zeus, he did not die, but was translated to Elysium.

MENENDEZ DE AVILES, *mā-nĕn′dĕth dā â-vē′lĕs*, PEDRO: 1519–1574, Sep. 17; b. Aviles, Spain. For many years he had cruised as a privateer with great success against the French corsairs, when Philip II. made him his councilor and capt.gen. of his India fleets. He convoyed Philip to England to marry Queen Mary; was very successful against the pirates; and brought to Philip the reinforcements that won the battle of St. Quentin. 1565, June 29, he went from Cadiz with 34 vessels to found a colony in Florida, of which he had been made *adelantado.* Near the mouth of the St. John's river he found the French Huguenot colony under Ribault; captured their fort Caroline, and treacherously massacred nearly the entire body of French settlers after their surrender to him on his promise to spare them. This he justified on the ground, not of their being Frenchmen, but heretics; and he affixed inscriptions to this effect to their bodies hanged on trees. On this expedition St. Augustine was discovered and named; posts established at Cape Canaveral, and at Port Royal, S. C.; and the coast explored as far n. as Chesapeake Bay. Then M. returned to Spain to make his report. During his absence the French adventurer Dominique de Gourgues captured San Mateo, as Ft. Caroline had been named, and cruelly avenged the massacre of the French colony —hanging the Spaniards on the same trees which had borne the bodies of their victims. In 1570 M. sent a vessel with a colony of Jesuits to the Rappahannock; but they all were massacred by the Indians. M. at once, 1572, came over and avenged the destruction of his colony, and explored the Potomac. He was recalled, however, soon after, while engaged in strengthening and enlarging his colony, to take command of a fleet against the Netherlands; but while fitting out this fleet. he died at Santander.

MENES, *mē′nēz:* first king of the first Egyptian dynasty. He built Memphis, made foreign conquests, introduced luxury, and is said to have been devoured by a hippopotamus. During his reign, there was a revolt of the Libyans. His name marks a great chronological epoch, being placed by chronologists B.C. 3643, 3892, or even 5702. Stricter chronologists make his accession B.C. 2717. This name, M., which signifies 'the conductor,' has been found on inscriptions, but no contemporary monuments of him are known.—Bunsen, *Egypt's Place*, ii., 579; Lepsius, *Königbuch, quellentaf.*, 5; Böckh, *Manetho*, 386; R. S. Poole, *Hor. Ægypt*, 219.

MENEVER: see MINEVER.

MENEVIAN, a. *mĕn-ē′vĭ-an* [from *Menevia*, the Roman name of St. David's: it is a corruption of Henemenew, the old British name]: of or belonging to St. David's.

MENFI, *mĕn′fē*, or MENFRICI, *mĕn-frē′chē:* town of Sicily, province of Girgenti, 43 m. s.s.w. of Palermo, crowning a long bare height, about three m. from the coast. Pop. 9,900.

MENGS, *mĕnks*, ANTON RAFAEL: German artist and writer on art: 1728, Mar. 12—1779, June 29; b. Aussig, Bohemia; son and pupil of Israel M., a mediocre painter. From the age of 13 to 16 he studied in Rome, giving his time wholly to the works of Michael Angelo, Raphael, and other old masters. On his return to Dresden 1744, he was appointed court-painter to Augustus III., king of Poland and Saxony, but with permission to go back to Rome. Here he gained praise by a picture of the 'Holy Family.' The young peasant-girl who sat for the Virgin so charmed the painter by her beauty, that he entered the Rom. Cath. Church, and married her. In 1754 he accepted the presidency of the newly instituted Academy of Painting (the Vatican school) at Rome. Within the next few years, he executed the frescoes in the church of San Eusebio, and those of *Apollo and the Muses on Parnassus* for Cardinal Albani. In 1761 he went to Madrid, on invitation from Charles III. of Spain, and executed a great variety of works, the best known of which is his *Aurora*. Returning to Italy, he was employed by Clement XIV. on a large allegorical subject for the Vatican Library, representing Janus dictating to History. After three years, he again visited Spain, and there produced his best-known work, *Apotheosis of the Emperor Trajan*, executed on the dome of the grand saloon in the royal palace at Madrid. On his way back to Italy, he stopped at Monaco, where he painted his picture of the *Nativity*, reckoned by many his finest piece. He d. in Rome. M.'s works are careful and elaborate imitations of the great masters. He had great gift at borrowing the technical qualities of a painter; but the living soul of genius, the quickening and creative power of imagination, was not his. M.'s writings were edited in Italian by Azara 1780: they are learned expositions of his 'eclectic theory' in art, which pro-

poses to reach perfection by a close imitation of diverse excellencies of various artists. There is an English translation (Lond. 1796).

MENG-TSE, *měng-tsĕh'* (i.e., the teacher Meng; earlier, MENG-KO; Latinized by the Jesuits into MENCIUS, which is the form most known): B.C. 385 or 372—B.C. 289; b. in the village of Tséou, in the present dist. of Shantung: Chinese sage, greatest of the early Confucians. His repute in China is next to that of Confucius, whom M. acknowledged as his great master. His father died while M. was very young; but he was educated with such admirable care by his mother, that the phrase 'mother of Meng' has become a proverbial term for an excellent preceptress. At that period, China was divided into a number of states, all acknowledging the suzerainty of the emperor of Tseu. M. travelled to several courts, seeking through more than 20 years to introduce his doctrines of 'virtue' and 'justice;' but unfortunately, he found that princes and great men did not admire these things so much as poor scholars did. His conversations with rulers and state-functionaries, with his disciples and acquaintances, were written down by his admirers. They form the *Hi-tsi*, otherwise called the Book of Meng-tse—the fourth of the Four Books: see CONFUCIUS. Many of the thoughts are exquisitely true, suggestive, and subtle. Several translations of it have been published, but they fall far short of the energy, sententiousness, freshness, and vivacity of the original. There is a Latin one by S. Julien (1824), an English one by Collie (1828), and a French one by Pauthier (1851). See Faber's *Mind of Mencius* (transl. 1881), and the works of Legge and Douglas.

MENHADEN, *mĕn-hā'dĕn* (*Alosa menhaden*): fish of the same genus with the Shad (q.v.), which is caught in great quantities on the coasts of New England and New York during summer, when it visits them for the purpose of spawning. Its length is 8 to 14 inches; the color of the upper parts is greenish brown, the belly silvery, a black spot on the shoulder, the whole surface iridescent. The M., though eatable, is not very palatable, but is rich in oil, which is used by painters, and is considered superior to linseed oil. Vast quantities of this fish are taken in some seasons, and are sold for manure, one fish being considered equal to a shovelful of barn-yard manure, and 2,500 sufficient for an acre of land. Steam-vessels are largely used for this capture.

MENHIR, n. *mēn'ēr* [W. *maen*, a stone; *hir*, high]: a tall rude or sculptured stone of unknown antiquity, placed upright in the ground, and standing singly or in groups.

MENIAL, a. *mē'nĭ-ăl* [OF. *maisnee* and *meisnee*, the dependants on the head of the family, the household servants—from mid. L. *maisnada* and *mainada*, for *mansĭonāta*, a family, a household (see MEINY): comp. Gael. *muinn*, a house]: *strictly*, belonging to the office of a ser-

vant; pertaining to the rougher parts of household work; low; servile; humble: N. a servant who does the rougher parts of household work; a domestic of the very humblest rank; any servile, cringing person. ME'NIALLY, ad. *-ăl-lĭ.*

MENIER, *mė-ne-ā'*, EMILE-JUSTIN: 1826—1881; b. Paris. He studied chemistry; established laboratories at St. Denis, which he threw open for the free use of students and scientists. In 1859 he established an annual prize for researches into the properties of drugs; 1864, he founded a school of practical chemistry, and gave 10,000 francs for establishing a series of lectures on this subject. He built free model schools, at his own cost, at Noisiel; and divided 10,000 francs among the school-teachers of the different departments of France reporting the largest attendance of pupils. He was head of the most important drug house in the country; retiring from which he made a fortune by the manufacture of chocolate, and founded a thriving colony of comfortable cottages for the operatives in his factories, at Noisiel, with schools, baths, hospital, etc. He became one of the richest men in France, and in his splendid residence in Paris gathered a rare collection of art objects and antiquities. He owned 6,000 acres, besides a tract 25 m. sq., in Nicaragua, where were his cocoa-tree plantations that supplied his factories at Noisiel. In 1862 he was on an international jury at the London exposition; and 1867, at the Paris exposition, was commissioner for Nicaragua and Costa Rica. He was in several battles during the Franco-Prussian war, having organized an ambulance corps, with which he personally cared for the wounded. In 1870 he was elected a member of the conseil-général of Seine-et-Marne; and later of the chamber of deputies. He bought (1879) the chateau of Noisiel for $2,000,000. Menier was chosen a member of the Cobden Club in Great Britain; and did much to establish closer commercial relations between France and the United States, being a chief promoter of the Franco-American treaty of commerce, for which he was laboring at the time of his death.

MENILITE, n. *mĕn'ĭl-īt* [after *Menil*-montant, near Paris]: a brown and opaque variety of opal; liver-opal.

MENINGES, n. plu. *mĕ-nĭn'jēz* [Gr. *meningx*, a membrane, *mening'gos*, of a membrane]: membranes which envelop the brain and spinal cord—called the *pia-mater*, *dura-mater*, and *arachnoid*. MENINGITIS, n. *mĕn'ĭng-jī'tĭs*, inflammation of the membranes covering the brain or spinal cord. MENINGEAL, a. *mĕ-nĭn'jē-al*, pertaining to the meninges.

MENINGITIS: inflammation of the membranes covering the brain and spinal cord. When the inflammation involves solely or chiefly the dura mater it is called *pachymeningitis:* when the pia mater or arachnoid is

involved, to the exclusion for the most part of the dura mater, it is called *leptomeningitis.* Meningitis may be of the membranes of the brain only—*cerebral meningitis;* of those of the spinal cord only—*spinal meningitis;* or of those of both brain and spinal cord—*cerebrospinal meningitis.*

Tuberculous meningitis is a form of cerebral meningitis in which the inflammation is limited chiefly to the membranes at the base of the brain. It is due to the deposit of tubercles excited by the presence of the tubercle bacillus. The common name for this form of meningitis is acute hydrocephalus. See HYDROCEPHALUS.

Epidemic cerebrospinal meningitis is an acute infectious disease caused by the presence of a special microbe, *Diplococcus intracellularis meningitidis.* Other names for the disease are spotted fever, malignant purpuric fever, petechial fever. The disease was first described by Dr. North, an American physician, in 1811. In 1838-40, it appeared in France, and committed great ravages in Versailles, where the mortality was 28 per cent.; in Strasburg, where the mortality was 42 per cent.; in Lyons, Nancy, and other garrison towns. The patients, in these cases, were almost entirely young conscripts. In the spring of 1846 it appeared in the Dublin and Belfast workhouses, boys under 12 years of age being the only victims. In 1863, it was very fatal in the United States. In 1865, it ravaged West Prussia; of 2,000 cases recorded, half died; and of 347 cases, 330 were under 14 years of age. An epidemic occurred again in Ireland in 1866-67.

It begins rather suddenly with a chill, headache, vomiting, stiffness and pain of the back and neck, sensitiveness of the eyes to light and of the ears to noise, and fever. The latter may be slight or high, having no relation apparently to the severity of the infection. The patient is irritable and restless at the beginning, but usually becomes delirious, the delirium giving way in the later stages to coma. In children there is retraction of the head, boring into the pillow, and sometimes the whole spine is bent from the loins to the head, forming a bow with convexity forward (opisthotonos). There is apt to be a squint and the eyes are partially closed through paralysis of the muscles which raise the lids. There is twitching of the face and sometimes muscular tremor of the entire body; in children there may be convulsions. In about three-fourths of the cases there is an eruption of purplish spots, from the size of a pinhead to that of a walnut, beginning on the face and extending over the legs and body. The abdomen is retracted, the bowels are constipated. The course of the disease varies greatly; it may be very mild, the usual symptoms being present, but in slight degree; it may be intermittent, the symptoms subsiding markedly at a regular period every day or every other day, but returning with

equal or greater severity; it may be very protracted, justifying the appellation chronic; or finally, it may strike one with the suddenness and violence of a blow from a club, the patient dying in from 6 to 24 hours from the beginning of the attack, often before the typical symptoms have had time to develop. The mortality from the disease is very great, yet instances of apparently spontaneous recovery are not unknown. The treatment is not very satisfactory. Good results have been obtained by warm baths frequently repeated, and some cases of successful serum treatment have been noted.

Sporadic cerebrospinal meningitis is the same disease as that just described, but occurs in isolated cases instead of epidemic form.

MENIPPUS, *mē-nĭp'ŭs:* one of the most noted of the Cynic philosophers, pupil of Diogenes: lived B.C. 1st c.; b. Gadara, in Syria. He was originally a slave, and acquired considerable wealth by usury, but lost it all again; and in mortification strangled himself. He satirized the philosophers of his time in terms so severe, that the most biting satires were afterward designated Menippean. Lucian pronounces him 'the greatest snarler and snapper among all the old dogs' (the Cynics). His works, 13 in number according to Diogenes, all are lost.

MENISCUS, n. *mĕn-ĭs'kŭs* [Gr. *menis'kŏs*, a little moon —from *mēnē*, the moon]: a lens, convex on one side and concave on the other, with a sharp edge, resembling in section the appearance of the new moon. MENISCUSES, n. plu. *mĕn-ĭs'kŭs-ĕz*, or MENISCI, n. plu. *mĕn-ĭs'sī*. MENIS'CAL, a. *-kăl*, pertaining to a meniscus. MENIS'COID, a. *-koyd* [Gr. *cidos*, resemblance]: having the form of a meniscus; crescent-shaped.

MENISPERMACEÆ, *mĕn-ĭ-spėr-mā'sē-ē:* natural order of exogenous plants, mostly tropical and sub-tropical; creeping and twining shrubs, the wood of which is frequently disposed in wedges, and without the zones usual in exogenous stems. The leaves are alternate, generally simple, destitute of stipules; the flowers small, unisexual, often in large panicles or racemes. There are about 200 known species, including those which by some botanists have been formed into the two small separate orders *Schizandraceæ* and *Lardizabalaceæ*. The true menispermaceæ are generally bitter and narcotic; some are very poisonous, and some are valuable in medicines. See CALUMBA; CISSAMPELOS; COCULUS.

MENISPERMIC, a. *mĕn'ĭ-spėr'mĭk* [Gr. *mēnē*, the moon; *sperma*, seed—from the crescent-like form of the seed]: denoting an acid obtained from the seeds of the plant *Menisper'mum coc'eŭlus*, or *Coc'eŭlus in'dĭeus*. MEN'ISPER'MINE, n. *-spėr'mĭn*, an alkali obtained from the *Coeculus indicus*.

MENIVER. See MINEVER.

MENNO, *mĕn'nō*, SIMONS: founder of the later school of Anabaptists (q.v.) in Holland: 1496—1561; b. Witmarsum, Friesland. He took orders 1524, and officiated for some years as a priest, first in the village of Pinjum, afterward in his native place. The study of the New Testament, about 1530, excited grave doubts in his mind regarding the truth of the prevalent doctrine and constitution of the church; and in 1536 he withdrew from the church altogether, attached himself to the party of the Anabaptists, was rebaptized at Leeuwarden, and appointed a teacher and bishop at Gröningen. Thenceforth, his great endeavor was to organize and unite the scattered members of the Anabaptist sect in Holland and Germany. With this design, he spent much time in travelling; but Friesland was his chief residence until persecution compelled him to flee to Wismar. Finally, he settled at Oldeslohe, in Holstein, where he found protection, and even encouragement, and was allowed to establish a printing-press for diffusion of his religious opinions. Here he died. He was a man of gentle and modest, but deeply earnest, devout, and spiritual nature, with no trace of the wild fanaticism of the Earlier Anabaptists. His book of doctrine, *Fundamentbuch von dem rechten Christlichen Glauben*, was published 1539. See ANABAPTISTS.

MENNONITE, n. *mĕn'ŏn-īt* [after *Menno*, their founder, a German, 1536]: an Anabaptist sect originating in Holland, who teach that the New Testament is the only rule of faith, that there is no original sin, that infants should not be baptized, and that oaths and physical force are unlawful. As they publish no statistics, their numbers are conjectural. They came to the United States first 1683, and, attracted by the Friends under Penn, 500 families settled in Pennsylvania within a half century. They are now found mostly in Pennsylvania, New York, Maryland, Ohio, Indiana and Canada. They have a publishing house at Elkhart, Ind. The pastors serve without pay; the bishops, elders, and deacons meet in annual district conferences. The following are secessions from the main body in America: the *Reformed* or strict Mennonites, who seceded 1811; the *New* Mennonites, a small organization dating from 1847; the *Evangelical* Mennonites, seceders 1856 from the previous secession; the *Amish*, scarcely distinguished from the Reformed.—The report for 1907 places the whole number of Mennonites in the United States at 61,690. See MENNO, SIMONS; ANABAPTISTS.

MENOLOGY, n. *mĕn-ŏl'ŏ-jĭ* [Gr. *mēn* or *mēna*, a month; *logos*, a discourse]: in the *Gr. Chh.*, a calendar of saints or martyrs; a register of months.

MENOMINEE, *mē-nŏm'ĭ-nē:* city, county seat of Menominee co., Mich.; at the mouth of Menominee river, on Green bay, and on the Chicago, M. & St. P., the Wis-

consin & M., and the Chicago & N. W. railroads; opposite Marinette (q.v.) and about 50 m. n.e. of Green Bay, Wis. The first settlement was made in 1799 by Louis Chappieu, a French fur trader. The first lumber mill was built in 1832, but the town was not incorporated until 1883. It is situated in an extensive lumbering region, and it is one of the largest lumber-shipping ports on the Great Lakes. Its chief industries are connected with the lumbering interests; the principal manufactures are lumber in all forms, paper, shoes, boxes, machinery, telephones, steam-boilers, beet-sugar, electrical machinery, and lumber-camp outfits. The city has a fine high school, public and parish schools, and a public library which contains about 5,000 volumes. It has St. Joseph's hospital, the county buildings, and several fine churches. The government is vested in a mayor and council elected annually. The city treasurer and the justice of the peace are elected by the people; the other administrative officers are chosen by the mayor and council. Pop. (1900) 12,818; (1910) 10,507.

MENOMONEE: city, county seat of Dunn co., Wis.; on the Red Cedar river, and on the Chicago, St. P., M. & O. and the Chicago, M. & St. P. railroads; about 68 m. e. of St. Paul, Minn. It is in an agricultural region and near the lumber section of the state. The chief manufactures are lumber, wagons, carriages, machinery, foundry products, brick, and flour. The trade is principally in lumber, flour, fur, brick, and wheat. Menomonee is the seat of the Stout Manual Training School and a normal training school. It has the Mabel Tainter Memorial Library, which contains about 8,500 volumes. The Dunn County Asylum is near, but outside the city limits. Pop. (1900) 5,655; (1910) 5,036.

MENOMONEES, *mė-nŏm'o-nēz,* or MENOM'INEES, *-ĭ-nēz:* a tribe of Algonquin Indians, until the 19th c. located in Wisconsin, on the Menomonee river, which empties into Green bay. The name is derived from the wild rice that grows abundantly near the mouth of the river. The Jesuits Allouez and André, who established a mission among the Menomonees about 1670, described them as lighter in complexion than the other Indians. They remained friendly to the French, aiding in the relief of Detroit against the Foxes 1712, and taking part in Braddock's defeat, and other battles of the French and English war. During the American revolution most of them went over to the British; in the war of 1812, also, they sided with them, taking part in the capture of Mackinaw, 1812, July; fighting under Tecumseh at Ft. Meigs 1813; being repulsed at Sandusky, and engaged at the battles of Mackinaw and Prairie du Chien, 1814. In 1817, Mar. 30, they ratified through their chiefs the French, English, and Spanish grants of land to Clarke, Edwards, and Chouteau. Repeated treaties were made with the United States, 1825-27-31-36-48-52-54. Since

1854 they have been on a reservation of poor land on the upper Wolf and Oconto rivers, 50 m. from Green Bay, Wis. They are decreasing; numbering now about 1,359. About half of them are Roman Catholics. Their language is a dialect of the Algonquin.

MENOPAUSE: change of life, cessation of menstruation, marking, as a rule, the termination of the child-bearing period. The time of life at which this occurs varies greatly in different races, and is influenced by climate, altitude, occupation, physical condition, etc.; in general it occurs between the ages of 40 and 50 years. In women who have borne many children in rapid succession and in the obese it occurs early, sometimes even by the age of 35 or earlier. The symptoms marking the change of life are various. In some women the only symptom is the arrest of menstruation; in others this occurs gradually, being preceded by more or less irregularity in the function, both in the period of its recurrence and in its amount. A common symptom and one that often causes great distress is the so-called flushing. This is a paroxysmally recurring redness of the surface accompanied by a sensation of heat, alternating frequently with pallor and chilliness. These flushings may recur many times a day for years, or there may be two or three attacks at intervals of weeks or months. The menopause is a normal phenomenon in the life of woman and seldom calls for interference on the part of the physician. A woman at this time should if possible avoid excitement, hard physical labor, and anything likely to disturb the general health. There is but one word of precaution: excessive flooding is not a normal symptom of the menopause; it may occur and signify nothing or it may be a symptom of serious trouble; a physician should therefore always be consulted in such cases.

MENOPOME, *mĕn'ō-pōm* (*Protonopsis horrida*): one of the largest of batrachians; found in the Ohio and other rivers of the same region, and known on their banks by many names, such as hellbender, mud devil, ground puppy, young alligator, and tweeg. In form, it resembles the newt and salamander; the head is flat and broad; the teeth in two concentric rows in the upper jaw, and one row in the lower, numerous and small; it is about 2 ft. long, and of slaty gray color, with dark spots. Notwithstanding its small teeth, it is fierce and voracious, feeding chiefly on fish and batrachians; and is commonly but erroneously regarded as venomous.

MENORRHAGIA, n. *mĕn'ŏr-rā'jĭ-â* [Gr. *mēn*, a month; *mēnĕs*, a woman's menses; *rhegnu'mi*, I break or burst forth]: an immoderate flowing of the menses.

MENSES, n. plu. *mĕn'sēz* [L. *mensis*, a month]: the monthly discharges of women. See MENSTRUATION.

MEN'SHIKOFF (or MEN'SHIKOW), ALEXANDER DANILOVITCH: Russian field-marshal and minister of state:

1672, Nov. 28—1729, Oct. 22 (Nov. 2); b. Moscow. He was a baker's apprentice, when his intelligent countenance attracted the notice of General Lefort, who took him into the service of Peter the Great. He discovered a conspiracy among the Czar's guards, and his rapid promotion was secured. 1706, Oct. 30, he defeated the Swedes at Kalisch; was made a field-marshal on the field of Pultawa; 1713 took Stettin, but gave it up to Prussia, contrary to the will of the czar; was court-martialed, condemned to death but pardoned on payment of a heavy fine. During the reign of Catharine I., he regained his influence at court, and, after her death, governed Russia with almost absolute authority in the name of Peter II., whose father-in-law he was just about to become, when he was overthrown by Dolgorouki, and banished to Siberia 1727, Sep. His immense estates and treasures were confiscated.

MEN'SHIKOFF (or MEN'SHIKOW), ALEXANDER SERGEJEVITCH, Prince: Russian general and statesman: 1789—1869; great-grandson of Alexander Danilovitch Menshikoff. He served in the campaign of 1812-15, rose to the rank of general, and, after the accession of Emperor Nicholas, was employed both in diplomatic and military services. In the Turkish campaign of 1828, he took Anapa after a short siege, but received so severe a wound before Varna as compelled his retirement. He was afterward at the head of the Russian navy, and raised it to high efficiency. In 1853, Mar., he was sent as ambassador to Constantinople, where his overbearing behavior produced a speedy rupture between the Porte and the czar, and brought about the Crimean war. In this war he commanded both the land and naval forces of Russia, and evinced the utmost energy in defending Sebastopol. In 1855, Mar., he was appointed commander of Cronstadt. Menshikoff was one of the most prominent members of the old Russian party.

MENSTRUAL, a. *mĕn'strû-ăl* [L. *menstruâlis*, every month—from *mensis*, a month: F. *menstruel*]: happening once a month; lasting a month; pertaining to a menstruum. MEN'STRUATION, n. *-ā'shŭn*, monthly discharge of blood from the generative organs of the human female during the period in which she is capable of procreation. The first appearance of this discharge, to which the terms *menses* and *catamenia* (each having reference to the monthly period) are indiscriminately applied, is a decided indication of the arrival of the period of commencing womanhood, and is usually accompanied by an enlargement of the mammary glands, and other less important changes. In this country, menstruation usually commences between the 14th and the 16th years, and terminates between the 48th and 52d years. (See MENOPAUSE.) The interval usual between the successive appearances of the discharge is about four weeks, though it is often shorter: the duration of the flow is usually

three or four days, but is liable to great variations. The first appearance of the discharge is usually preceded and accompanied by pain in the loins and general disturbance of the system, and in many women these symptoms invariably accompany the discharge. As a general rule, there is no menstrual flow during pregnancy and lactation, and its cessation is one of the first signs that conception has taken place. MEN'STRUANT, a. *-ănt,* subject to monthly flowings. MEN'STROUS, a. *-ŭs* [L. *menstrŭŭs,*]: pertaining to the monthly discharges of women; having the monthly discharge.

MENSTRUUM, n. *mĕn'strû-ŭm,* MEN'STRUA, n. plu. *-strû-ă,* or MEN'STRUUMS, n. plu. *-ŭmz* [L. *menstrŭŭm,* that which lasts or continues a month—from *mensis,* a month]: a solvent; any liquor used in dissolving. *Note.*—So called because the old chemists supposed that the moon had a mysterious influence on the making of their preparations for dissolving metals, etc.

MENSURATION, n. *mĕn'sū-rā'shŭn* [mid. L. *mensurātĭōnem,* a measuring—from *mensurātus,* measured—from L. *mensūra,* a measure]: the act or art of measuring or taking the dimensions of anything; a branch of the mathematics which gives rules for finding the lengths of lines, areas of surfaces, and the volumes of solids. MEN'SURABLE, a. *-sūr-ă-bl* [It. *mensurabile;* F. and Sp. *mensurable,* mensurable]: that can or may be measured. MEN'SURABIL'ITY, n. *-bĭl'ĭ-tĭ,* or MEN'SURABLENESS, n. *-bl-nĕs,* the quality of being measurable; the capacity of being measured. MEN'SURAL, a. *-shû-răl,* pertaining to measure.

MENSURATION: branch of geometry which teaches, from the actual measurement of certain lines of a figure, how to find, by calculation, the lengths of other lines, the areas of surfaces, and the volumes of solids, i.e., how many linear, superficial, or solid *units* these contain. The lengths of straight lines and circular arcs are obtainable by geometry or trigonometry. Thus the hypotenuse of a right angled triangle is the square root of the sum of the squares of the two sides; the circumference of a circle of radius a is $2\pi a$. The area of a parallelogram is the product of its base and altitude; areas of other rectilinear plane figures are found by dividing them into triangles. The area of the circle is πa^2. The volume of a prism or cylinder is the product of its altitude by the area of its base; that of a pyramid or cone is one-third this product; other solids with plain faces are divided into pyramids to ascertain their volume. The surface and the volume of the sphere of radius a are $4\pi a^2$ and $4/3\ \pi a^3$, respectively. The lengths of *curved* lines, *areas* of curved surfaces, and volumes of solids with curved faces are determined by the integral calculus. For approximate values it usually suffices to divide the figure into parts small enough so that the curvature of the

boundaries can be neglected. The planimeter is used in finding plane areas. Chapters on mensuration are generally found in the text-books on geometry and trigonometry. The prismatoid formula

$$V = \frac{1}{6} h\,(b + b' + 4m)$$

where V is the volume of the prismatoid (solid with plain faces, the two end faces being parallel), h its altitude, b, b' and m the areas of the two ends and the section midway between them, is of great value in the mensuration of solids.

MENTAGRA, n. *mĕn-tā'gră* [L. *mentum*, the chin; Gr. *agra*, a seizure]: a disease affecting the beard, mustache, whiskers, and inner part of the nostrils—caused by minute fungi, or vegetable parasites, at the roots of the hair.

MENTAGRAPHYTE, n. *mĕn-tăg'ră-fīt* [L. *mentum*, the chin; Gr. *agra*, a seizure, and *phuton*, a plant]: cryptogamous plants, or mold, supposed to be the cause of the cutaneous disease mentagra; synonym of MENTAGRA.

MENTAL, a. *mĕn'tăl* [F. *mental*—from mid. L. *mentālis*—from L. *mentem*, the mind: It. *mentale*]: pertaining to the mind; intellectual. MEN'TALLY, ad. *-lĭ*, in the mind; in thought or meditation. MENTAL DISEASES (see INSANITY: ETC.). MENTAL PHILOSOPHY (see MIND). MENTAL RESERVATION, a practical fraud, in which a part of the truth only is revealed; the act of mentally adding to words spoken that which destroys their truthfulness or value; an incomplete statement.

MENTAL, n. *mĕn'tal* [etymology doubtful]: a watertight basket, used in the East, with four ropes attached, by which two men lift water from a stream or cistern and discharge it into a trench for irrigation.

MENTAL (PSYCHIC) BLINDNESS: that condition in which one is unable to recognize the visual properties of an object although the object itself may be seen. Perception is a process of interpretation in terms of previous experience: mental blindness results when the visual associations are inhibited or wiped out. The visual reflexes and automatisms may be intact, but the mental blindness seer sees an object without being able to ascribe any meaning to it unless he learns its properties through other senses. The disturbance is usually conditioned upon disintegration within the visual area of the cortex. A dog from which this portion of the cortex has been extirpated may be able to avoid objects by sight but is unable to distinguish their qualities; e.g., to distinguish a piece of meat from a stick of wood, by sight. Word-blindness is a specific form of mental blindness and is due to disturbances in the visual speech center. See APHASIA.

MENTAL (PSYCHIC) DEAFNESS (MIND-DEAFNESS): the loss of the ability to understand or interpret the meaning of sounds heard. (Cf. MENTAL BLINDNESS;

APHASIA.) It is analogous to mental blindness and is most frequently known in the forms of word-deafness, the inability to appreciate the significance of words heard; or tone-deafness, the inability to appreciate the musical qualities of tones heard.

MENTAL DEVELOPMENT. See GENETIC PSYCHOLOGY.

MENTAL PHILOSOPHY, or MENTAL SCIENCE: terms formerly used to designate the general field now appropriated by psychology, logic, ethics, metaphysics and æsthetics. Mental philosophy was originally used in English in distinction from natural philosophy, the term generally employed until recent years to designate the natural sciences such as physics, chemistry and biology. Mental science is loosely used to indicate the same philosophical territory. It is nowadays sometimes used by teachers of so-called mind cure (q.v.) to label their peculiar province.

MENTHA, n. *mĕn'thă* [L. *mentha*, mint]: a genus of plants whose species are strongly scented and yield volatile oils, order *Labĭātæ*. MENTHENE, n. *mĕn-thē'nē*, or MENTHOL, n. *mĕnth'ōl* [L. *olĕŭm*, oil]: two organic bodies occurring in oil of peppermint: menthol is the name given to a crystalline substance deposited from oil of peppermint, and used in alcoholic solution (10 parts of alcohol to 1 of menthol), or solid in form of a pencil, as a remedy for headache, applied to the seat of the pain.

MENTHOL: sometimes termed 'mentha camphor,' is the chief constituent of peppermint oil from *Mentha piperita*. It can be prepared by artificial means, its chemical name is 5-methyl-2-isopropylhexahydrophenol $H_3C\,CH<^{CH_2.CH(OH)}_{CH_2.CH_2}>CH\,CH(CH_3)_2$, and it is a *secondary alcohol* (see CHEMISTRY). Menthol is a colorless solid, melting at 42° C. and boiling at 212° C. It resembles peppermint in its odor and taste.

MENTHONE: $CH_3CH<^{CH_2.CO}_{CH_2.CH_2}>CH(CH_3)_2$, is the ketone of *menthol* (q.v.) and is allied closely with camphor. It is found in American and Russian peppermint oils and can be prepared artificially. It has an odor of peppermint and is a colorless liquid, boiling at 206° C. Its sp. gr.=0.896 at 20° C.

MENTION, n. *mĕn'shŭn* [F. *mention*—from L. *mentĭōnem*, a mentioning: comp. L. *mĕmĭnī*, I remember: It. *menzion*]: a hint or suggestion; a brief statement in words or writing: V. to write or express in words any particular circumstance or fact; to utter a brief remark; to name. MEN'TIONING, imp. MEN'TIONED, pp. *-shŭnd*. MEN'TIONABLE, a. *-ă-bl*, that can or may be mentioned.

MENTONE, *mĕn-tō'nā* (Fr. *Menton*, *mŏng-tōng'é*): town in the department of Alpes Maritimes, France;

pleasantly situated on the shore of the Mediterranean, and from its southern exposure, and a high sheltering range of mountains on the north, it has a salubrious and agreeable climate. In its environs are groves of orange, lemon, and olive trees. Latterly Mentone has become a favorite winter resort of invalids and 'health-loungers' from England, Germany, and America; and is greatly improved as a place of residence by the addition of numerous hotels, pensions, etc. In 1860, by vote of the inhabitants, Mentone was detached from the small principality of Monaco, and annexed to France; the French government paying 4,000,000 of francs to the Prince of Monaco for relinquishing his rights, and according to him certain privileges. Mentone is within a mile and a half of the Italian frontier, on the railway and Corniche road from Nice to Genoa. Its bone-caves are very notable, 90 ft. above the Mediterranean, on the e. bay: they contain fossils and implements of prehistoric times, and, 1872, yielded a fossil human skeleton from a depth of 21 ft. 6 in. Pop. 15,000.

MENTOR, n. *mĕn'tėr* [*Mentor*, a wise Greek, friend of Ulysses, sung of by Homer]: wise and faithful monitor or adviser. MENTO'RIAL, a. *-tō'rĭ-ăl*, containing advice.

MENTOR, *mĕn'tor:* son of Alcimus and trusted friend of Ulysses, who, on setting out for Troy, left to him the charge of his household. By Mentor, Telemachus was educated, and his name became a sort of appellative for an instructor and faithful, sagacious counselor of the young.

MENTUM, n. *mĕn'tŭm* [L. *mentum*, the chin]: the basal portion of the labium or lower lip in insects.

MENTZ. See MAINZ.

MENU, n. *mĕn-ū'*, MENUS, n. plu. *mĕn-ūz'* [F.]: a bill of fare for table; also, the dishes, etc., included in it.

ME'NU. See MANU.

MENU'RA. See LYRE-BIRD.

MENZALEH, LAKE, *mĕn-zâ'lėh:* lake in Egypt, extending e. from the Damietta branch of the Nile, and separated from the Mediterranean by a narrow strip of land, through which there are several openings. It receives the Pelusiac and Tanitic branches of the Nile; and is 37 m. in length, by about 16 m. in average breadth. Its surface is studded with islands, the most interesting of which is Tennees, anc. Tennesus, with Roman remains of baths, tombs, etc. There is an extensive fishery, and the shores abound in wild-fowl. The line of the Suez Canal passes through the eastern portion of this lake.

MENZEL, *mĕn'tsėl,* WOLFGANG: German author: 1798, June 21—1878, Apr. 23; b. Waldenburg, Silesia; son of a medical practitioner. He studied at Jena and Bonn, was for two years schoolmaster at Aargau, in Switzer-

land, and 1824 returned to Germany. He made himself known in the literary world by his *Streckverse* (Heidelb. 1823), a volume replete with poetry and wit, and opening novel and ingenious views of art and literature. He then engaged with several coadjutors in a periodical *Europäische Blätter* (Zür. 1824–5), attacking the heartlessness and formality of German literature. Including in his attack the school of Goethe, he became involved in controversy. A succession of controversies followed his various publications; among which may be noticed *Geschichte der Deutschen* (3 vols. Zür. 1824–5, several editions); *Die deutsche Literatur* (2 vols. Stuttg. 1828, several editions); *Taschenbuch der neuesten Geschichte* (5 vols. Stuttg. 1829–33); *Mythologische Forschungen und Sammlungen* (1842, etc.); and *Geschichte Europas von* 1789–1815 (1853). As a poet, he acquired reputation by a volume *Rübezahl* (1829), and *Narcissus* (1830). His *Gesänge der Völker* (1851) is a valuable lyrical collection. After the July revolution, he set himself to counteract the French influence that set in strongly among the youth of Germany, whence Börne gave him the nickname of *der Franzosenfresser* ('the Frenchman-eater'). He also published *Preussen und Oesterreich im Jahre* 1866 (1866); history of the war of 1870–1; etc. His library, 18,000 vols., was acquired by the Univ. of Strasburg.

MEPHISTOPHELES, n. *mĕf'ĭs-tŏf'ĕ-lēz* [a character in Goethe's *Faust*]: a devil next in rank to Satan; he was one of the seven chief devils in the ancient demonology, and second of the fallen archangels, a subtly suggestive tempter: hence, a sneering, jeering, yet subtle tempter—a well-known type being the cold, scoffing fiend of Goethe's *Faust.* MEPH'ISTOPH'ILUS, n. *-ĭ-lŭs*, formerly a familiar and jocular name of address, arising from the popularity of the legends of Faustus. MEPH'OSTOPH'ILUS, in *Shakespeare*, name of a familiar spirit.

MEPHITIC, a. *mĕ-fĭt'ĭk* [L. *mephītis*, a noxious pestilential exhalation: F. *méphitique*]: offensive to the smell; noxious; deadly. MEPHITIS, n. *mĕ-fī'tĭs*, or MEPHITISM, n. *mĕf'ĭ-tĭzm*, any foul or noxious exhalation—applied to carbonic acid gas.

MEPPEL, *mĕp'pĕl:* important trading and manufacturing town in the Netherlands, province of Drenthe, near the n. boundary of Overyssel. It has a trade in butter, cattle, rye, and buckwheat. In some years about 4,000,000 lbs. of butter are brought to market. The principal manufactures are spinning flax, weaving linens, sailcloth, and coarse striped woolen fabrics. There are also corn, saw, and oil mills, breweries, etc. The union of several important water-ways with the Meppeller Diep, through which they flow into the Zuider Zee, brings a large shipping-trade to the town. M. is about nine centuries old, and has often suffered the evils of war, being favorably situated for receiving a garrison.—Pop. 9,000.

MEQUINEZ: see MIKNAS.

MERCANTILE, a. *mėr'kăn-tīl* [It. and F. *mercantue*, connected with trade—from mid. L. *mercantīlis*, mercantile—from L. *mercātus*, trade, traffic; *mercans*, a purchaser]: relating to trade; trading; carrying on commerce; commercial.

MER'CANTILE AGENCY: see COMMERCIAL REGISTER.

MER'CANTILE LAW: the only branch of municipal law which, from the necessity of the case, is similar, and in many respects identical, in all civilized and trading countries. In determining the relations of the family, the church, and the state, each nation is guided by its own peculiarities of race, of historical tradition, of climate, and numberless other circumstances, which are almost wholly unaffected by the conditions of society in the neighboring states. But when the arrangements for buying, selling, and transmitting commodities from state to state alone are in question, all men are much in the same position. The single object of all is *disputes and delay*. Very early in the trading history of modern Europe, it was found that the only method for attaining these objects was by establishing a common understanding on leading points of mercantile, particularly of maritime law. This was effected by the establishment of those maritime codes of which the most famous, though not the earliest, was the *Consolato del Mare*, sometimes spoken of as a collection of the maritime laws of Barcelona, but seeming to have been rather a compilation of the laws and trading customs of various Italian cities—Venice, Pisa, Genoa, and Amalfi, together with those of the cities with which they chiefly traded—Barcelona, Marseille, and the like. That it was published at Barcelona toward the end of the 13th c., or the beginning of the 14th, in the Catalonian dialect, is no proof that it originated in Spain; and the probability is that it is of Italian origin. As commerce extended itself to the n.w. coasts of Europe, similar codes appeared—the *Guidon de la Mer*, the *Rôles d'Oléron*, the *Usages de Damme*, and, most important of all, the Ordinances of the great Hanseatic League. As the central people of Europe, the French early became distinguished in maritime law; and one of the most important contributions ever made to it was the famous ordonnance of 1681, which formed part of the ambitious, and in many respects successful, legislation and codification of Louis XIV. See CODE. All these earlier attempts at general mercantile legislation were founded, of course, on the Roman civil law, or rather on what that system had borrowed from the laws which regulated the intercourse of the trading communities of Greece, perhaps of Phœnicia and Carthage, reduced to a system by the Rhodians.

From the intimate relation between Scotland and the continent of Europe, the lawyers of Scotland became early acquainted with the commercial arrangements of the continental states; and until the rebellions of 1715

and 45, mercantile law was cultivated in Scotland with much care and success. The work of Lord Stair, greatest of all legal writers of Scotland, is particularly valuable in this department.

In England. the case was very different. After the loss of her French provinces, the legal system of England became wholly insular, and there was no branch in which it suffered more by its isolation from the general stream of European progress than the law-merchant. It was Lord Mansfield who, whether guided by the wider traditions of his original country, or deriving his views from the source from which these traditions sprang—viz., the Roman law, as modified and developed by continental jurisprudence, introduced those doctrines of modern commercial law which English lawyers have since developed with so much acuteness and logical consistency.

MER'CANTILE SYS'TEM: see BALANCE OF TRADE.

MERCAPTAN, n. *mėr-kăp'tăn* [new L. *mercūrĭus*, mercury; L. *captans*, taking or seizing: another derivation is from L. *mercurio corpus aptum*]: chemical substance in the form of a liquid, composed of sulphur, carbon, and hydrogen—so named from its very energetic action on mercury; ethyl sulph-hydrate; the sulphur analogue of ethyl alcohol—that is, alcohol in which oxygen is replaced by sulphur.

MERCATOR, *mėr-kā'tėr*, GERARDUS (Latinized form of GERHARD KAUFFMANN—i.e., Merchant): 1512, Mar. 5—1594, Dec. 2; b. Rupelmonde, Flanders. He studied and took a degree in philosophy at the Univ. of Louvain; afterward studying specially mathematics and geography: he learned engraving also, and was employed on maps by Charles V. 1559, he was made cosmographer to the Duke of Juliers and Cleves. He published maps and descriptions of Europe, France, Germany, the British Isles, and the world. His name has been perpetuated by his method of laying out maps and charts by a projection of the surface *in plano*, the meridians being represented by parallel lines intersected at right angles by the straight horizontal lines representing parallels of latitude. Edward Wright, however, seems to have used this projection in nautical maps. The most important of M.'s works are a *Chronological Table from the Creation to* 1568 (1569); series of *Geographical Tables* (1578); treatise *De Creatione ac Fabrica Mundi* (1594); *Atlas* (1595), or geographical meditations; and a number of theological writings. He died Duisburg.

MERCATOR'S CHART or PROJECTION, *mėr'kā-tėrs chârt* [after *Mercator*, a Flemish geographer]: a chart or map on which the surface of the earth is represented as a plane surface, with the meridians and lines of latitude all straight lines: see MAP.

MERCED, n. *mėr′sĕd* [Sp. *mercéd*—from L. *merces* or *mercēdem*, wages, a reward]: a reward or gift for services done.

MERCENARY, a. *mĕr′sĕ-năr-ĭ* [F. *mercénaire;* L. *mercenārĭŭs*, one working for wages—from *mercēs*, hire or wages: It. *mercenario*]: actuated by the hope of gain or reward; venal; that may be or is hired, as troops; greedy of gain; sordid; mean; selfish: N. one who is hired; a soldier hired into foreign service; a hireling. MER′CENARILY, ad. *-năr-ĭ-lĭ.*

MERCER, n. *mėr′sėr* [F. *mercier*, a mercer—from mid. L. *mercērĭus*, a trader—from L. *mercem*, goods, wares]: a dealer in silks, woolen cloths, and laces. MERCERY, n. *mėr′sėr-ĭ*, the goods sold by a mercer. MER′CERSHIP, n. the business of a mercer. MERCERS' COMPANY, one of the twelve great livery companies of London.

MERCER, *mėr′sėr*, HUGH: 1721–1777, Jan. 12; b. Aberdeen, Scotland. He was educated at the Univ. of Aberdeen; entered the medical profession; 1743 served at Culloden under Charles Edward, the 'young Pretender,' as asst. surgeon; 1747 came to America, and settled as physician near what is now Mercersburg, Penn.; 1755 served under Braddock as volunteer; was appointed capt.; at the battle of Monongahela, July 9, he was wounded, and wandered alone through the forest till he reached Ft. Cumberland, 100 m. distant. The city of Philadelphia awarded him a medal for gallantry on this occasion. In 1758 he was made lieut.col., and commanded the post at Ft. Duquesne for some time. At the outbreak of the American revolution he was a physician at Fredericksburg, Va., but at once entered the conflict, organizing a regt., of which he was made col., 1775; and 1776, June 5, was commissioned a brig.gen. by congress through Washington's influence, with whom he served on the retreat through N. J. At the battle of Trenton he commanded a column, and led the van in the night-march on Princeton. At the subsequent battle he was severely wounded while vainly trying to rally his militia, and was left for dead on the field. After the battle he was removed to a neighboring farm-house, where he died in the arms of his aide-de-camp, Maj. Lewis, about a week later. He was buried at Philadelphia, when fully 30,000 people are said to have attended his funeral. A monument was erected to his memory in Laurel Hill cemetery in 1840, and a grateful nation educated his son Hugh at public expense.

MER′CER, JOHN FRANCIS: 1758–1821, Aug. 30: b. Stafford co., Va. He graduated 1775 at William and Mary College; served as aide to Gen. Charles Lee in the continental army till the battle of Monmouth, when he resigned from the army, but soon enlisted again and served through the war. Afterward he studied law under Jefferson, and, 1782–85, served in the continental congress as delegate from Va. In 1785 he married and removed to West River, Md.; 1792–94, represented Md. in congress;

served in the state legislature; then, 1801–03, as gov. of Md.; afterward again in the legislature. He died while on a visit to Philadelphia.

MERCERSBURG THEOLOGY: embodiment of certain speculations in Christian doctrine whose chief originator (abt. 1836) was the Rev. F. A. Rauch, Ph.D., and which was developed by John W. Nevin, D.D., prof. in the German Reformed Theol. Seminary, then at Mercersburg, Penn. These speculations—whose derivation seems traceable in part, at least, from Schleiermacher—find their central point in peculiar views of the person of Christ and the nature of man. Concerning *the person of Christ*, Dr. Nevin says: He has only one life, which is in all respects a true human life; the incarnation is the completion of humanity, and the glorified Christ manifests the advancement of human nature to the power of a divine life. Concerning *human nature:* Humanity is a generic life, of which man is the manifestation, with a special bodily organism by which it becomes personal. This generic humanity sinned in Adam, and thus became corrupt in all individual men. This generic humanity also, Christ united with his divinity, merging both in one generic human life which is a form of the life of God. Its sinning in Adam and its consequent corruption are to be regarded only as imperfect development. God is imperfectly manifested in man generally, but perfectly in Christ and through him finally in the redeemed. Concerning *justification:* Our nature reaches out after a real union with the being of God as the consummation of its own life. The incarnation is the proper completion of humanity. The Word became flesh—not a single man only, but humanity in its universal conception. Thus Christ, became the origin of a new order of existence for the human world as such. Christianity is a life, revealed at first in Christ, but continued also in the church. It flows over from Christ to his people always in this form. They do not simply bear his name and acknowledge his doctrine, but are so united to him as to have part in the substance of his life itself. With his substance thus communicated to the soul, come his merit, his holiness, his power, his glory. When Christ died and rose, humanity died and rose in his person. Our nature was thus restored and elevated, and by receiving this renovated theanthropic nature we are saved. Concerning *the church:* The divine-human nature as it exists in the person of Christ passing over, as has been said, to his people, constitutes the church 'which is his body, the fullness of him who filleth all in all.' The process is not mechanical, but organic. It takes place in the way of history. It is a growth, a regular living development. 'The church must have a true theanthropic character throughout, and is, in very deed, the depositary and continuation of the Savior's theanthropic life, with powers and resources which imply a real blending of the human and divine.' Concerning *the sacraments:* Some, at least, of these powers and resources are vested in the sacraments

of the church, giving them a real objective force. While union with Christ is by regeneration, regeneration is by the church. The sacraments convey to believers the divine-human life of Christ. Unbelievers receive only the outward sign, because they have not the vital organ of reception for the inward grace. Yet the inward grace is there, and believers receive both—the outward sign and the theanthropic life of Christ. This gives the sacrament an extraordinary power as supplying a mode of receiving Christ which can be had nowhere else. Where the souls of believers are prepared to receive it, the sacrament itself conveys into their persons the life of Christ.

The Mercersburg Theology has been developed in three lines successively—philosophical, theological, liturgical. Philip Schaff, D.D., had a prominent share in the movement. At first it excited suspicion and controversy. These have long since ceased; and Mercersburg theology, no longer a living issue in a conflict, has done a formative and constructive work of recognized value as it has become merged with other elements in the general stream of theological thought.

MERCHANT, n. *mėr'chănt* [OF. *marchant;* F. *marchand,* a shopkeeper, a dealer—from It. *mercatante,* a trafficker—from mid. L. *mercatan'tem,* selling: It. *mercatare,* to buy and sell; *mercato,* a market—from L. *mercārī,* to bargain, to buy]: one who buys and sells goods of any kind, especially upon a large scale; one carrying on trade with foreign countries; a wholesale dealer. MERCHANTABLE, a. *mėr'chănt-ă-bl,* fit for market; such as may be bought and sold in market at current prices. MERCHANDISE, n. *mėr'chăn-dīz,* anything bought and sold in trade; goods; wares. MER'CHANTMAN, a trading ship or vessel. MERCHANT SERVICE, the mercantile marine of the country. MERCHANT-SHIP, a trading ship; a ship carrying passengers or cargo, or both.—SYN. of 'merchant': broker; dealer; factor; furnisher; maker; mercer; seller; trader; warehouseman; trafficker.

MER'CHANT, COMMISSION. See COMMISSION MERCHANT; FACTOR.

MERCHANTS' MARKS: in the middle ages, devices indicative of trades or occupations, allowed by the heralds to be borne by merchants, traders, and others to whom the proper use of heraldry was not conceded. A cutler might bear his knife, a tailor his shears, a mason his trowel and compasses. These insignia were in strictness ordered to be borne only in 'targets hollow at the chief flankes'; yet we often find them on shields, sometimes even impaled and quartered with arms. Merchants often bore, with a monogram of their initials, a mark composed of a cross and a figure resembling the numeral 4 turned backward—perhaps a symbol of the Holy Trinity, though it has been explained also to represent the mast and yard of a ship. The insignia of their companies were frequently borne by merchants in a chief

above their marks, and occasionally quartered with them. These merchants' marks were the precursors of the trade brands and marks of our own time. Many of them are sculptured on the walls and roofs of the churches of the 14th c. and 15th c., and engraved on monumental brasses in England and continental Europe. Seals with merchants' marks are occasionally found appended to conveyances of land.

MER'CIA: See HEPTARCHY.

MERCIA, *mĕr'shĭ-a:* England, the largest kingdom of the Saxon heptarchy, now comprised in the midland counties on both sides of the Trent from the North Sea to Wales, Mercia was founded by Crida in 585. Like the other Anglo-Saxon kingdoms it had a stormy history, being almost continually at war with some of its neighbors. In 827 it was conquered by Egbert, who united the different kingdoms of England into one. As its frontiers extended to those of the other kingdoms, as well as to Wales, it derived its name from that circumstance (Anglo-Saxon *mearc,* march or boundary). See ENGLAND, *History.*

MERCIÉ, *mĕr-sē-ā,* ANTONIN: French sculptor and painter: b. Toulouse 1845, Oct. 30. He studied under Jouuroy and Falguière; won the first Prix de Rome in 1868; and in 1872 obtained a medal of the first class for his bronze statue of the young David, now in the Luxembourg. His masterpiece was *Gloria victis* (1874), followed by a nude throned Juno (1877), a marble statue of *Painting* (1890); *William Tell,* now in Lausanne; monuments to Thiers, Meissonnier (in front of the Louvre), and Jules Ferry, and *Napoleon* on the Vendôme Column. He painted a Venus, now in the Luxembourg. Since 1891 Mercié has been professor in the Paris Academy.

MERCIER, HONORE': Canadian lawyer, journalist, and politician, some time premier of the province of Quebec: b. Iberville, Quebec, 1840, Oct. 15; d. Montreal 1894, Oct. 30. He was educated at St. Mary's (Jesuit) College in Montreal and afterwards studied law at St. Hyacinthe, being admitted to the bar in 1865. During his legal studies (1862-64) he was editor of the *Courrier de St. Hyacinthe,* the conservative organ of the district. As a journalist he was among those who opposed the project of Canadian Confederation, fearing that the union of the provinces might be fatal to the distinctive position of the French Canadians. This led him to abandon his editorship and to sever his connection with the Conservative party.

During the years immediately following the confederation of 1867 Mercier devoted himself to his profession, but in 1871 he reappeared in politics as the leader of the National Party (also called the Parti noir), whose leading aim was to curtail the power of the Dominion gov-

ernment in favor of provincial rights. On this platform he was elected to the federal parliament for Rouville in 1872, but did not stand for re-election to the parliament of 1873. After some four years devoted to the successful practice of the law at St. Hyacinthe, Mercier was elected (1879) to the Legislative Assembly of Quebec, being appointed solicitor-general of the province in the ministry of M. Joly. On the defeat of the Joly administration in the same year, Mercier passed into the opposition, of which he presently became the leader.

In 1881 he left St. Hyacinthe to practice law in Montreal. In 1885 the French Canadian population was thrown into a ferment by the trial and execution of Louis Riel, the leader of the North West Rebellion (q.v.). Mercier, heading the agitation thus occasioned, declared Riel to have been a 'victim of the fanaticism of Sir John A. Macdonald' (speech at Montreal, 1885, Nov. 22). On the strength of the feeling this aroused, the Conservative party was defeated in the provincial elections of 1886 and Mercier found himself at the head of the administration. In this capacity he carried through the legislature the famous Jesuits Estates Act (q.v.), a measure intended to compensate the Jesuits for the property confiscated by the crown at the time of the papal dissolution of the order. In spite of the agitation throughout Canada against the act the Mercier government was upheld in the election of 1890. On a visit to Europe in connection with a provincial loan Mercier was created by the Pope a count and commander of the order of St. Gregory (1891). In the same year grave charges of peculation were brought against the premier and his colleagues on the ground that a subsidy of $100,000, intended for the Baie des Chaleurs railway, had been diverted to political uses. The investigation ordered by Lieutenant-Governor Angers resulted in the dismissal of the ministry 1891, Dec. 15. This action was ratified by the overwhelming defeat of the Mercier party in the election which ensued. The criminal charges brought against Mercier, as a result of this and a second official investigation, ended in a verdict of not guilty. Mercier remained a member of the assembly but with diminished influence and shattered health. He appears to have planned a movement in favor of Canadian independence, but his death prevented its realization.

MERCUR, *mėr'kėr*, JAMES: American soldier: b. Towanda, Pa., 1842, Nov. 25; d. West Point, N. Y., 1896, Apr. 22. He was graduated from West Point in 1866 and commissioned in the engineering corps. He was engaged in surveys made under the government and in 1867-72 was assistant professor of natural and experimental philosophy at West Point, after which he was in command of an engineering corps and in 1876-81 assisted in clearing the New York harbor of the obstructions at Hell Gate. He was professor of civil and military en-

gineering at West Point from 1884 until his death. He published a revised edition of Mahan's *Permanent Fortification* (1887) and the original works, *Elements of the Art of War* (1888); and *Military Mines, Blasting, and Demolitions* (1892).

MERCURY, n. *mėr'kū-rĭ* [Norm. F. *mercurie*—from L. *Mercurĭŭs*, in *anc. myth.*, the son of Jupiter and Maia, the messenger of the gods—from L. *mercārī*, to traffic—in his earlier statues Mercury holds a purse of money]: an elementary body, forming a metal white like silver, but in a liquid state at common temperatures, congealing or becoming solid at about 40 degrees below zero Fahr. (see below): a salt, a preparation of mercury, extensively used in medicine (see MERCURY AND MERCURIALS, below): one of the planets, being the one nearest the sun; a carrier of tidings; a newspaper; sprightly qualities in a man; a wild plant with rough ovate leaves, and green inconspicuous flowers—the *Mercurĭālis perenn'nis*, ord. *Euphorbĭācĕæ*. MERCURIAL, a. *mėr-kū'rĭ-ăl*, active; sprightly and gay; versatile; consisting of or containing mercury or quicksilver. MERCURIALIZE, v. *mėr-kū'rĭ-ăl-īz*, to affect the system with mercury. MERCU'RIALIZING, imp. MERCU'RIALIZED, pp. *-īzd*. MERCU'RIALIST, n. *-ĭst*, one under the influence of Mercury; one resembling the god Mercury in variety of character.

MER'CURY. See HERMES.

MERCURY: the planet of the solar system which is nearest to the sun. Owing to the position of its orbit, far inside of that of the earth, it is never seen by us at any great distance from the sun, but seems to swing back and forth, first on one side of the central luminary and then to the other. (See SOLAR SYSTEM). Its time of revolution is a little less than three months, and therefore less than one-fourth that of the earth. When, starting from a point between the earth and the sun, it has completed a revolution, the earth has moved forward in its orbit, and, in consequence, nearly 30 days more are required to catch up with the earth and again come into conjunction with it. Consequently the time of one synodic or apparent revolution is nearly four months. It follows that its greatest elongations from the sun occur at intervals of nearly 60 days, alternately to the east and to the west. When near its greatest eastern elongations it may be seen in the west toward the close of twilight. When west of the sun it may be seen in the morning after daybreak. To the naked eye it seems to shine as a star of the first magnitude. But as it is never seen in a perfectly dark sky except when very near the horizon, it is not readily observable in high northern latitudes. It is said, in fact, that Copernicus died without ever seeing this planet.

With the aid of a telescope, Mercury may be seen the greater part of the time—in the afternoon when it is east of the sun; in the morning when it is west of it.

But it is never seen fully illuminated unless near the farther part of its orbit, beyond the sun, when it may be lost in the effulgence of the sun's rays. When it approaches nearest to us, only a small portion of the hemisphere presented to us is illuminated. Owing to these unfavorable conditions observations on it are extremely difficult, and it cannot be said that anything is certainly known of its physical constitution. The difficulty is increased by its being much the smallest of all the major planets. The result is that nothing is positively known as to the time of the rotation on its axis. About 1800, Schroeter, a celebrated observer of the planets, thought it rotated in a little more than 24 hours. But Herschel found no foundation for this belief, and could see no evidence whatever of a rotation. About 1880 Schiaparelli, the celebrated Italian astronomer, making a very careful study of the planet, under the favoring sky of Milan, was led to the conclusion that, like the moon, Mercury's time of rotation was the same as its time of revolution in its orbit, so that it always presented the same face to the sun. A similar conclusion was reached by Lowell at the Flagstaff Observatory. But the difficulty of seeing any well-defined features on the planet is such that conservative astronomers are still in doubt on the subject, and regard the time of rotation as still unknown, and not likely soon to be determined.

The most remarkable feature presented by the motion of Mercury is that the perihelion of its orbit is found to move forward considerably faster than it ought to by virtue of the attraction of the known bodies of the solar system. The cause of this motion has perplexed astronomers for half a century, and no positive solution has been found. It was at first supposed by Leverrier to be due to the attraction of one or more unknown planets between Mercury and the sun. But, as will presently be shown, this explanation is no longer tenable. Another explanation is that the motion is due to the sun's gravitation diminishing somewhat more rapidly than it would according to the law of the inverse square. If this is so, the perihelion of all the other planets ought to be effected by a similar motion. But it unfortunately happens that, up to the present time, it is not possible to discover with certainty whether there is or is not such an excess of motion in the case of the other planets. The reason of the difficulty is that the eccentricities of the orbits of Venus and of the earth are so small that such a motion in their perihela cannot be detected until 50 or 100 years more of observation have been made. In the case of Mars the observations seem to show that there is really such an excess of motion; but the result is not at all conclusive, and cannot be made so until a more perfect comparison than yet exists between the observations of Mars and the theory of gravitation has been made.

MER'CURY, Dog's (*Mercurialis*): genus of plants of natural order *Euphorbiaceæ*, having unisexual flowers, a tripartite perianth, 9-12 stamens, two simple styles, and a dry two-celled fruit with two seeds. The species are not numerous. The Common Dog Mercury (*M. perennis*) grows in woods and shady places. It has a perfectly simple stem, about 12 in. high, with rough ovate leaves, and axillary loose spikes of greenish flowers. It turns a glaucous black color in drying, and the root contains two coloring substances, one blue and the other carmine; so that it may probably become important in dyeing. It is very poisonous. The mercury which some old writers mention as a pot-herb is not this plant, but *Chenopodium Bonus Henricus*.—Annual Dog Mercury (*M. annua*) is a rarer plant, and less poisonous: the leaves are indeed eaten in Germany, as spinach.—A half-shrubby species (*M. tomentosa*), found in the countries near the Mediterranean, has had extraordinary reputation from ancient times; the absurd belief mentioned by Pliny being still retained, that if a woman after conception drink the juice of the male plant, she will give birth to a boy, and if of the female plant, her offspring will be a girl—the male plant, however, being mistaken for the female, and the female for the male.

MERCURY [symbol Hg (Hydrargyrum), at. wt. = 200 (hydrogen = 1)]: occurs together with its chief ore cinnabar, which is a red crystalline variety of the sulphide, HgS, in Spain, California and Austria. When heated in a current of air this sulphur burns to sulphur dioxide and the mercury vaporizes and is condensed by bringing the vapor into contact with water. Mercury resembles silver in appearance, hence the popular name quick (living) silver, is the only metal liquid at the ordinary temperature. It boils at 357°C., freezes at 39.5°C. and gives off a little vapor at the ordinary temperature. It is largely used in the arts, for the manufacture of thermometers and barometers and for making electrical connections. Its combinations (alloys) with other metals are called amalgams. One of the most important is that formed from mercury, cadmium and a little copper, which is used by dentists for filling teeth (silver fillings). Mercury is also employed to cover the zinc plates of galvanic batteries, to prevent the zinc dissolving when the battery is not in use. It quickly amalgamates with silver and also with gold and is, therefore, used to extract these metals from their ores. When the amalgams are heated the mercury volatilizes and leaves the other metal behind. It will be apparent from this that mercury should never be manipulated until all rings or other jewelry have been removed from possible contact with it, and it should never be poured down an ordinary sink because it will attack at once any lead pipe and form a brittle amalgam. Mercury changes its volume very regularly for change of temperature, moreover its boiling and freezing points are

very far apart, hence its use in thermometers. Its employment in barometers depends on its great density, 13.6. Mercury forms two basic *oxides* Hg_2O and HgO, which give rise to the *mercurous* and *mercuric* salts, respectively. The former, *mercurous oxide,* is a brownish black powder. The most important salts corresponding to it are the *nitrate,* $HgNO_3$, which is the only soluble mercurous salt, and the *chloride,* HgCl, often termed *calomel.* These may also be prepared by the action of *cold dilute* acids on mercury, in excess, or by the action of mercury on a mercuric salt. *Mercuric oxide* is obtained in the form of red crystals (red precipitate) by heating mercury in contact with oxygen or air, or by heating the nitrate. It may also be produced by adding an alkali hydroxide (caustic soda or potash) to a solution of a mercuric salt, in which case it forms an amorphous, orange-colored powder. *Mercuric chloride,* $HgCl_2$, also called *corrosive sublimate,* is prepared by subliming a mixture of common salt and mercuric sulphate, and is largely used in surgery as a most valuable antiseptic. It dissolves in water with some difficulty, but when it is mixed with ammonium chloride solution occurs with ease. Such mixtures are now on the market in the form of compressed tabloids. *Mercuric nitrate,* $Hg(NO_3)_2$, is soluble readily. In general, mercuric salts may be obtained from the metal and excess of *hot concentrated* acid. *Mercuric sulphide,* HgS, is known as a black, amorphous powder, and also in red crystals, which are used for paint under the name *vermillion.* Chemically this is the same as cinnabar (see above). Vermillion is often adulterated with red lead, which gives a less brilliant color and is not so stable. Mercury compounds, chiefly of the mercurous series, are used largely in medicine, either alone or in combination with other substances. In small doses they act as purgatives (calomel, blue pill), in larger or long continued doses they produce serious symptoms, including profuse salivation and loosening of the teeth. The mercuric salts are more actively poisonous than the mercurous compounds. In certain stages of syphilis mercury, in some form, is an invaluable remedy and, indeed, is the only effective one known. Mercury yields a number of rather complex compounds with ammonia. Its most important organic derivative is mercuric fulminate, $Hg(ONC)_2$, prepared by treating mercury with nitric acid and adding alcohol. It is highly explosive and is used in the manufacture of percussion caps and detonators.

MER'CURY AND MERCU'RIALS, Medicinal Uses of: applications important and various. Liquid mercury is no longer used in medicine, though, until lately, it was occasionally given with the view of overcoming, by its weight, obstructions in the intestinal canal. There are, however, many preparations which owe their value to *extinguished* mercury; that is to say, to mercury triturated with chalk, saccharoid matters, oil, etc., till globules can no longer be detected in it. It is possible that, in these cases, the metal is partly reduced to the state of suboxide. Among these preparations are—*Mercury with Chalk*, or *Gray Powder* (*Hydrargyrum cum Cretâ*), the mildest and best mercurial to administer to infants and children, the dose varying with the age; *Blue Pill* (q.v.); and the various ointments, liniments, and plasters of mercury. *Calomel* (termed in some of the pharmacopœias, *Hydrargyri Chloridum*, for the same reason that corrosive sublimate, as above mentioned, is termed in the same works *Hydrargyri Bichloridum*) has been perhaps more given than any other medicine of this class, though now less frequently used, and may be regarded, so far as its action is concerned, a type of mercurials generally. Given in small doses, the first effects of these medicines are observed in the increase of the various secretions, e. g. of the saliva (see Salivation), of the various fluids poured into the intestinal canal, and sometimes of the urine. When continued in small doses for some time, they cause the absorption of morbid fluids, and even of morbid products that have assumed a partially solid form. The following are some of the diseases in which they are of most importance: (1), In *internal congestions*, as of the liver, etc., to increase the secretions, and hence relieve the vessels of the affected organ; (2), in various *acute inflammations*, especially of serous mem-

branes (q.v.), of the structure of the liver and of the lungs, etc.; (3), in numerous forms of *chronic inflammation;* (4), in *dropsies*, dependent on inflammation of serous membranes or disease of the liver, but not in dropsy from disease of the kidneys, where these medicines are generally injurious; (5), in numerous *chronic affections* in which an alterative action is required; and (6) as a purgative (to be followed by a black draught), when a patient is in the condition popularly known as bilious (in this case blue pill is usually as efficacious as calomel).

In *syphilis*, mercurials were formerly universally prescribed; now they are not considered essential to the cure, except in comparatively few cases.

If calomel, blue pill, or any other mercurial be given in too large a dose, or for too long a period, most serious consequences may result—such as, very profuse salivation, with swelling of the tongue and gums, and loosening of the teeth; purging; certain skin affections; disease of the periosteum and of the bones (formerly ascribed to syphilis, but in reality due oftener to the supposed remedy); and a low, febrile condition (termed mercurial erythism), accompanied with great general prostration.

The doses of calomel for an adult vary from 3 to 6 grains when taken as a purgative. If the object is to affect the system generally, as in the case of acute inflammation, small doses (half a grain to two grains, combined with a little opium) should be given several times a day; while as an alterative, still smaller doses (not sufficient at all to affect the mouth) should be prescribed. The *Compound Calomel Pill* popularly known as *Plummer's Pill* (in which the calomel is associated with oxysulphide of antimony and guaiacum) is a most valuable alterative in chronic skin-diseases—a five-grain pill to be taken every night.

Corrosive sublimate (the *Bichloride* of the pharmacopœias, and *Oxymuriate* of the older chemists), though a very powerful irritant poison, is extremely useful in very minute doses as an alterative in many chronic affections of the nervous system, the skin, etc. The dose varies from one-thirtieth to one-eighth of a grain; the average dose of its pharmacopœial solution, the *Liquor Hydrargyri Bichloridi*, being one drachm, which contains one-sixteenth of a grain of the salt. This medicine should never be given on an empty stomach.

The above are the chief mercurial preparations given internally. Certain external applications require a few remarks. The plasters, ointments, and liniments are absorbed by the skin, and act in the same manner as mercurials taken internally.

White Precipitate Ointment is the universal application for destruction of lice; and is a useful stimulating application in chronic skin-diseases. *Ointment of Nitrate of Mercury*, popularly known from its yellow color as *Citrine*, or *Golden Ointment*, is, when sufficiently diluted, a most useful stimulating application in inflammation

of the eyelids, in indolent ulcers, etc.; and the *Ointment of Nitric Oxide of Mercury* is similar in its action. For the precipitated suboxide that occurs in *Black Wash*, and its use as a local application, see LINIMENT.

The *toxicological* relations of the mercurial compounds must be briefly glanced at. There are cases on record in which, probably from some peculiarity of constitution, ordinary and even small doses of the milder mercurials have caused death; thus, Christison mentions a case in which two grains of calomel destroyed life by severe salivation and by ulceration of the throat; and similar cases in which small doses of gray powder, blue pill, and calomel have proved fatal, are recorded by Taylor in *Medical Jurisprudence*. The preparations used for poisoning are mainly corrosive sublimate, and white and red precipitates, corrosive sublimate being used in at least four-fifths of the cases. The symptoms produced by a poisonous dose of this salt come on immediately, there being during the act of swallowing an intense feeling of constriction, and a burning heat in the throat, while a metallic taste is left in the mouth. Violent pain in the stomach and abdomen is felt in a few minutes, and vomiting of mucus and blood, and purging follow. The pulse becomes small, frequent, and irregular, the tongue white and shrivelled, the skin cold and clammy, the respiration difficult, and death is preceded by fainting or convulsions. Any dose exceeding two grains would probably prove fatal to an adult, unless vomiting were promptly induced, or the whites of eggs administered. Death ensues usually in from one to five days, but may take place in less than half an hour, or not for three weeks or more.

MERCY, n. *mėr′sĭ* [F. *merci*, a benefit or favor, pardon; It. *mercede*, reward, mercy—from L. *mercēs* or *mercēdem*, earnings, desert]: the act of sparing; pity; compassion; willingness to spare and save; clemency; pardon. MER′CIFUL, a. *-sĭ-fûl*, compassionate; tender; humane; willing to pity and spare. MER′CIFULLY, ad. *-lĭ*. MER′CIFULNESS, n. *-nĕs*, tenderness; willingness to spare; readiness to forgive. MER′CILESS, a. *-sĭ-lĕs*, without mercy; hard-hearted; cruel; unsparing. MER′CILESSLY, ad. *-lĭ*. MER′CILESSNESS, n. *-nĕs*, want of mercy or pity. MERCY-SEAT, the covering of the ark of the covenant among the Jews; God's throne. TO BE AT THE MERCY OF, to be wholly in the power of; to have no means of defense or safety. SISTERS OF MERCY, or *Order of our Lady of Mercy*, religious order of women in the Rom. Cath. Chh., founded in Dublin, A.D. 1827, who devote themselves to the succor and protection of the sick and destitute, and to visit hospitals and prisons (see SISTERHOODS).—SYN. of 'merciful': gracious; kind; mild; benignant; clement—of 'merciless': unmerciful; unfeeling; severe; barbarous; savage; remorseless; ruthless; pitiless;—of 'mercy': leniency; commiseration; sympathy; condolence; grace; tenderness; mildness.

MERCY, Fathers of: Roman Catholic religious congregation founded on the restoration of Louis XVIII., 1814, and approved of by the Pope (1834) under the title 'Society of the Priests of Mercy.' The object of the society is the conversion of sinners by mission preaching, and the practice of the corporal works of mercy. In 1839, the order founded houses in New York and Saint Augustine, Fla., and the fathers have churches for the French population in Brooklyn and Manhattan. The mother house was originally at Paris, but was removed to Rome in 1903 as a result of the Association Law. Consult: Delaporte, *Vie de Jean-Baptiste Rauzan* (1857).

MERCY-SEAT (Heb. *Kappo'reth*, covering or lid, that is, of the sacred ark in the ancient Jewish tabernacle): an unfortunate and inappropriate term as applied to the cover of the chest or ark containing the two tables of the law, and overspread by the wings of the Cherubim. Between these wings appeared the Shekinah or fiery symbol of the divine presence hovering over the mercy-seat, which consisted most probably of a sheet of the finest gold (Ex. xxv. 17, etc.; xxx. 6; xxxi. 7, etc.). The New Testament writers seem to hold that the term contains by implication the idea of the propitiation (q.v.) (Heb. ix. 5; Rom. iii. 24). The high priest sprinkled on it the blood of the yearly atonement, and some writers think that the term covering as applied to it refers more to the covering of or atonement for sins than to its use in covering the treasures of the ark. In any case the idea of a seat, as if the expression in Psalms xcix. 1, 'he sitteth between the cherubims,' referred to the earthly tabernacle, is inappropriate. Consult: Pratenias, *De Judæa Arca* (1727); Werner, *De Propitiatoria* (1695).

MERCY, Sisters of: a name given to members of several religious communities founded for the purpose of nursing the sick at their own homes, visiting prisoners, attending lying-in hospitals, superintending the education of females, and the performance of similar works of charity and mercy. Communities of Sisters of Mercy are now widely distributed over Europe and America. There are communities under the same name connected with the Anglican Church. The term is applied more specifically to the Order of Our Lady of Mercy, a Roman Catholic order founded for the objects above enumerated in Dublin 1827. The first house in America was established in Pittsburg, Pa., 1843, and from it have sprung 65 convents. Consult: *Leaves from the Annals of the Sisters of Mercy* (1881). See McAuley, Catherine.

MER DE GLACE: France, an Alpine glacier on the northern slope of Mont Blanc, with an area of 16 square miles, and an extreme length of about nine miles. It is formed by the confluence of three branches called the Glacier du Géant, the Glacier du Lechaud, and the Glacier du Talèfre, and is noted for its beautiful scenery. It

ends as the Glacier des Bois, whence flows the Arveyron river, in the valley of Chamouni. From the village of Chamouni the Mer de Glace is easiest visited and Mont Blanc ascended. The glacier has an average flow of two feet a day during summer and autumn.

MERE, a. *mēr* [L. *merus;* It. *mero,* alone, unmixed: Dut. *maar,* only, no more than: comp. Gr. *meros,* a part —from *meiro,* I divide]: this or that only; distinct from anything else; simple; absolute. MERE'LY, ad. *-lĭ,* simply; solely; 'n *OE.,* absolutely; utterly; entirely.—SYN. of 'merely': barely; wholly; purely; hardly; scarcely; unmixedly.

MERE, n. *mēr* [F. *mare;* Dut. *maer,* a pool: mid. L. *mara,* water generally: Ger. *meer;* Icel. *marr;* W. *môr;* Gael. *muir;* L. *mărĕ,* the sea]: a pool or lake.

MER'EDITH, GEORGE: English novelist and poet: b. Hampshire, Eng., 1828, Feb. 12. He was educated in Germany, and prepared himself for the legal profession, but early entered on a literary career, publishing (1851) a vol. of poems, (1855) a prose burlesque, *The Shaving of Shagpat,* and (1857) *Farina,* a legend of Cologne. A philosophical novel, *The Ordeal of Richard Feverel,* first brought him prominently before the public as a thoughtful and serious writer of great power. *Evan Harrington,* a social comedy, was published in 1861; *Modern Love,* poems and ballads (1862); *Emilia in England* (1864); *Rhoda Fleming* (1865); *Vittoria,* sequel of *Emilia in England* (1866); *The Adventures of Harry Richmond* (1871); *The Egoist* (1879); *The Tragic Comedians* (1881), a novel founded on the life and tragic death of the German socialist, Ferdinand Lasalle; *Poems and Lyrics of the Joy of Earth* (1883); *Diana of the Crossways* (1885); *Ballads and Poems of Tragic Life* (1887); *A Reading of Earth* (1888). *One of Our Conquerors,* a novel, was published 1890; *Lord Ormont and His Aminta* (1894); and *The Amazing Marriage* (1895). A vol. of poems, *The Empty Purse,* appeared 1892. Other works by him are: *Jump to Glory Jane* (1892); *The Tale of Chloe; The House on the Beach; The Case of General Ople and Lady Camper* (1895); *Comedy, and the Uses of the Comic Spirit* (1897); *Selected Poems* (1900); etc.

MEREDITH, LOUISA ANNE TWAMLY: Australian author and artist: b. Birmingham, England, 1812, July 20; d. Hobart Town, Tasmania, 1895, Oct. 21. She had already published a volume of verse (1835); and *The Romance of Nature,* illustrated by herself (1836), before she married her cousin, Charles Meredith (1839), and removed to Australia, whence they went to Tasmania five years later. She continued her literary activity till the end of her long life, and for many years before her death had been the most prominent Tasmanian author. Among her many books, often illustrated by herself, are: *My Home in Tasmania* (1852); *Over the Straits* (1860);

Tasmania: Friends and Foes, Feathered and Furred (1880).

MER'EDITH, Owen. See Lytton, Edward Robert, Earl.

MEREDITH, *mĕr'ė-dĭth,* Samuel: 1740—1817, Mar. 10; b. Philadelphia; son of a Welshman who was a friend of Washington. Meredith became a member of the Penn. colonial legislature; and when the American revolution broke out, he entered the colonial army as major, took part in several battles, and was made brigadier-general for gallant services. He gave £10,000 in silver for carrying on the war; and was exiled from Philadelphia when the British occupied it; 1787-88, he served in congress; 1789-1801, he was the first treasurer of the United States, advancing to the government, on taking the office, $20,000 and later $120,000, for which he was never reimbursed. He died at Belmont, Luzerne county, Penn.

MER'EDITH, William Morris, ll.d.: 1799—1873, Aug. 17; b. Philadelphia. He graduated at the Univ. of Pennsylvania 1812; studied law; and, 1820, began practice. 1824-28, he served in the legislature; 1834-49, was president of the Philadelphia select council; 1837, served as a member of the Penn. constitutional convention; 1849, was made secretary of the U. S. treasury, and held the office until President Taylor's death 1850. He was attorney-general of Penn. 1861-67; and president of the state constitutional convention 1873. He was constantly employed on important cases before the supreme court; and, 1871, was offered, but declined, the position of counsel for the United States at the Geneva conference on the Alabama question.

MEREDITH, Sir William Ralph, ll.b., ll.d.: Canadian jurist: 1840, Mar. 31; b. Westminster, Ont. He was educated in the University of Toronto and was admitted to the bar in 1861, when he established a law practice in London, Ont. He was a member of the Ontario legislature 1872-94 and became queen's counsel in 1876. In 1894, he was appointed chief justice of the Court of Common Pleas, which office he still holds, and he is chancellor of the University of Toronto. He was knighted in 1896.

MERENCHYMA, n. *mĕr-ĕng'kĭ-mă* [Gr. *meris,* a part, a particle; *engchŭma,* what is poured in, the substance of organs—from *engchŭō,* I infuse]: in *bot.,* tissue composed of rounded cells.

MERETRICIOUS, n. *mĕr'ĕ-trĭsh'ŭs* [L. *meretrīcĭŭs,* pertaining to a harlot—from *merĕtrix,* a harlot]: that is practiced by harlots; alluring by false show; having a gaudy but deceitful appearance. Mer'etri'ciously, ad. *-lĭ.* Mer'etri'ciousness, n. *-nĕs,* the quality of being meretricious.

MERGANSER, n. *mėr-găn'sėr* [Sp. *mergansar*—from Sp. *mergo;* L. *mergus,* a diver or gull—from L. *mergo,* I

dip, I dive: Sp. *ansar;* L. *anser,* a goose]. (*Merginæ*): sub-family of birds of family *Anatidæ,* having a slender, straight, much compressed bill, hooked at the tip, and notched at the edges, almost furnished with teeth. All these species of ducks are inhabitants of the seas and coasts of n. regions, but migrate southward in winter. The Goosander (q.v.) is the largest and best known of the species. The RED-BREASTED MERGANSER (*M. serrator*) is found in all the n. parts of the world. It is not much smaller than the goosander, which it much resembles.—The HOODED MERGANSER (*M. cucullatus*), a smaller species, only about 18 inches in entire length, is very plentiful in N. America.

MERGE, v. *mėrj* [L. *mergĕrĕ,* to dip or plunge under water: It. *mergere*]: to sink; to cause to be swallowed up; to be swallowed up or lost. MERG'ING, imp. MERGED, pp. *mėrjd.*

MERGENTHALER, *mĕr'gan-tâ-lėr,* OTTMAR: American inventor: b. Würtemberg, Germany, 1854, May 10; d. Baltimore, 1899, Oct. 28. He was a watchmaker by trade; came to the United States at 18; entered the employ of the United States government at Washington, where he kept clocks and electrical bells throughout government buildings in order; improved apparatus used in the signal service; and in 1876 removed to Baltimore, where he devoted himself to perfecting a type-setting machine. On this he spent several years, his scheme going through four stages, the last of which was the linotype (q.v.). When he had patented this machine he had much difficulty in introducing it. It was perfected by the addition of the Rogers spacer, brought its inventor large profits, and is now in very common use in large printing establishments. Mergenthaler also invented a basket-making machine.

MERGER, *mėrj'ėr,* in Law: extinguishment of a right by reason of its coinciding in the same person with another right of higher value in the estimation of law: and this may take place with or without the intention of the parties. The less right ceases to exist, but the greater right is not increased by the union. A merger may arise either of rights or of estates.

When a person acquires security of a higher value in the law than that which he possesses for a right or cause of action, his remedies are merged into those attaching to the greater security. Thus if a bond is given for a simple contract debt, the right of action for the contract indebtedness ceases, and an action must be brought on the bond; or if one sues another on his promise or indebtedness of any kind or for a wrong of any kind, and recovers a judgment, the original cause of action merges or is lost in the judgment.

Merger in estates takes place when a less and a greater estate meet in the same person without an intervening

estate; thus a mortgage will become merged in a deed, when the owner of the mortgage becomes the owner of the mortgaged property, and this merger is regarded as a payment of the mortgage debt; or if an estate in fee descends to a person owning the life estate, the life estate is merged in the fee and ceases to exist. In order that a merger of estates shall take place, the estates must be in the same property, must meet in the same person at the same time, and one estate must be inferior to the other as a matter of law, though perhaps not as a matter of fact. Thus an estate for a term of years, however many, would merge in an estate for life, which is necessarily of a limited number of years; an estate for life being in law a greater estate than an estate for a term of years. Where there is union of a legal and equitable estate in one person, the equitable or trust estate is extinguished, being merged in the legal estate; e.g., when a person for whom an estate is held in trust becomes the legal owner of the estate, the trust ceases, and the legal estate remains freed of the trust.

In criminal law a less offense will be merged in a greater offense committed by the same person; thus a murder committed by blows will include the assault and battery; but when the offenses are of equal degree no merger will take place. The law that when a person commits a crime that involves a wrong against some private person, the private wrong is merged in the crime, is generally abolished; so that the person committing the crime is now civilly responsible to the person whom he has wronged.

MERGUI' ARCHIPEL'AGO: group of 207 islands in the Gulf of Bengal, off the s. shores of the Tenasserim Provinces, lat. 9° to 13° n. The islands are mountainous, some rising 3,000 ft. above sea-level. Pearls are found on the coasts of many of them; and edible birds'-nests, which are sold to the Chinese and Malays, as also timber and coal, are among chief articles of export.

MERICARP, n. *mĕr'ĭ-kârp* [Gr. *meris,* a part; *karpos,* fruit]: the half of the fruit of an umbelliferous plant, like the hemlock.

MERIDA: former name of Los Andes, state in n.w. Venezuela; bounded n. by Zulia (Maracaybo), e. by Truxillo and Barinas, s. by Barinas and the United States of Colombia, w. by Pampnora; 10,000 sq.m.; cap. Merida. The surface consists of elevated table-lands and valleys, spurs of the Andes Mts. traversing it in all directions; it has 31 peaks over 10,000 ft. high; one, belonging to the Sierra Nevada range, being 15,066 ft. in height. The Grita, navigable 50 m. from its junction with the Zulia, is the largest of its numerous rivers. There are a number of considerable lakes, that of Lagunilla, 3,000 ft. above sea-level, yields quantities of sesquicarbonate of soda. Its productions are those common to the torrid and temperate zones. Pop. about 350,000.

MERIDA.

ME'RIDA: town of Venezuela, S. Amer., cap. of state of Los Andes, about 60 m. s. of the Lake of Maracaybo. It was formerly the largest and one of the most important cities of Venezuela; but in 1812 it was almost wholly destroyed by an earthquake, from which misfortune it has somewhat recovered, and is again flourishing. Pop. about 12,000.

MERIDA, *mĕr'ē-thâ* (anc. *Augusta Emerita*): small, decayed town of Spain, province of Estremadura, on the right bank of the Guadiana, 32 m. e. of Badajoz. It is unique in Spain, and is in some points a rival of Rome itself, on account of the number and magnitude of its remains of Roman antiquity. The Guadiana is here crossed by a Roman bridge of 81 arches, and with a length of 2,575 ft., and a breadth of 26 ft.; it was erected by Trajan. There is another Roman bridge over the Albarregas, 450 ft. long, 25 ft. wide, still quite perfect, in spite of the traffic of 17 centuries. There are also remains of a castle built by the Romans; and among other most noteworthy monuments of antiquity are an old half-Roman, half-Moorish palace, the Casa de los Corvos, constructed out of a temple dedicated to Diana, several aqueducts, an ancient theatre, and a circus. Merida was built B.C. 23, and flourished in great splendor, until, 1228, it was taken from the Moors, after which it began to decline. Pop. 7,390.

MERIDA, *mĕr'ē-dâ* or *mĕr'ē-thâ:* city, cap. of Yucatan, Mexico. The city was founded in 1542, and is situated on a level plain but little above sea level. There are railway connections with all important points in the interior, and several lines of steamers ply between Progreso, 25 miles distant, and Veracruz, New York, and other prominent commercial ports. The surrounding country is almost entirely devoted to the henequen industry, which has reached enormous proportions in the state. There are manufactories of cotton goods, cigars, panama hats, leather, soap, etc., and considerable trade in sisal hemp. The principal buildings are the government palace, the municipal palace, the Casa del Conquistador Montejo (the first Spanish house built in the city), the old Cathedral, the School of Arts, the Penitentiary, Literary Institute or State College, Normal School for Teachers, Meteorological and Astronomical Observatory, Yucatan Museum, Catholic College of San Ildefonso, schools of medicine, surgery, pharmacy, jurisprudence, and notarial instruction; the Literary Institute for Girls, the College for Girls, the Catholic School for Girls, the Teresean College, the Primary School of Arts and Works, and the Institucion de Beneficiencia Privado, founded by Leandro L. Ayala at an outlay of $1,000,000. There are an Asylum for Maniacs, a Lazareto, a Maternity Hospital, three other hospitals, an Asylum for Mendigos, two theatres, and an arena for bull fights. The Hidalgo Park contains a statue of General Cepeda Peraza; and one

symbolizing the peace of the state. Near the great Cathedral are also large statues of Saint Peter and Saint Paul. A Body of Public Security, a Jefe Politico and an Inspector General preserve order and insure safety to all. The streets are paved with asphalt. Merida contains two local financial institutions—the Banco Yucateca, with a capital of $8,000,000, and the Banco Mercantil de Yucatan, with a capital of $6,000,000, and a branch of the National Bank and an agency of the Bank of London and Mexico. Pop. about 42,000.

MER'IDEN, *mĕr'ĭ-dĕn:* Conn., city, in New Haven county; on branches of the New York, New Haven & Hartford railroad; about midway between Hartford and New Haven. Originally the town of Meriden was a part of Wallingford until 1806, when the town of Meriden was incorporated. In 1867, it was granted a city charter. It is situated in an agricultural region, but the city is noted for its large number of manufactories. Some of the principal manufactures are cutlery, silver and plated ware, steel pens, hardware, machinery, screws, vises, glassware, cut glass, malleable iron, bronzes, firearms, brass castings, curtain fixtures, gas and kerosene fixtures, self-playing attachments for pianos and organs, woodenware, tinware, granite, agate-ware, lamp trimmings, etc. The shipments are principally manufactured articles, fruit, vegetables, and tobacco.

The educational institutions are the public and parish schools, a high school and the Curtis Memorial Library. It has the Curtis Home for Orphan Children and Aged Women, the Connecticut School for Boys, and the Meriden Hospital. Lake Merimere, a beautiful body of water, is near, and another attraction is Hubbard Park, area 900 acres, within which are the Hanging Hills, peculiar elevations which are from 100 to 1,000 feet above sea-level. The government is administered under a charter of 1897. The mayor, who holds office two years, appoints fire and park commissioners, board of taxation and apportionment, police and board of public works. The council elects the health officer, board of compensation, tax collector, plumbing inspector, boiler inspector and fire marshal. The treasurer, sheriff, clerk, and auditor are chosen by popular vote. Pop. (1910) 32,066.

MERIDIAN, n. *mĕ-rĭd'ĭ-ăn* [F. *méridien,* circle in astronomy—from L. *meridiānus,* belonging to midday—from *meridiēs,* midday—from *mĕdĭŭs,* middle; *diēs,* day]: midday or noon: thence the highest point of anything; culmination, as of life or of fame. Meridian is applied technically in geog. (*Terrestrial Meridian*) and in astron. (*Celestial Meridian*), denoting the imaginary great circle of the celestial sphere which passes through both poles of the heavens, and also through the zenith and nadir of any place on the earth's surface, cutting the equator at right angles: every place on the earth's surface has consequently its own meridian. The meridian is divided by

the polar axis into two equal portions, which stretch from pole to pole, one on each side of the earth. It is midday at any place on the earth's surface, when the centre of the sun comes upon the meridian of that place; at the same instant it is midday at all places under the same half of that meridian, and midnight at all places under the opposite half. All places under the same meridian have, therefore, the same longitude (see LATITUDE AND LONGITUDE); and the term meridian is applied to the brass ring surrounding a globe, on which the degrees are marked. Stars attain their greatest altitude when they come upon the meridian; the same thing is true approximately of the sun and planets; and, as at this point the effect of refraction upon these bodies is at a minimum, and their apparent motion is also more uniform, astronomers prefer to make their observations when the body is on the meridian. The inconvenience arising from having a fixed meridian in different countries is sufficiently obvious, and geographers, navigators, and astronomers have all found it frequently a source of confusion. After years of fruitless discussion the question of a reference or first meridian for the world came before an international conference held at Washington, 1884, Oct. 1 to 22. There, although the representatives of France and Brazil dissented, it was agreed to recommend the meridian of Greenwich both as the astronomical and as the geographical reference meridian of the world, longitude to be reckoned east and west from this up to 180°. At the same time it was advised that the astronomical day should begin at midnight, mean Greenwich time, the hours for astronomical purposes being reckoned as before from 0 to 24. This arrangement began on Jan. 1, 1885. Previously many foreign map-makers had accepted the meridian of Greenwich as first meridian, Germans and Americans apparently having no jealousy of Great Britain in regard to the matter. The change of time has had some importance for astronomers, but ordinary civil time is still computed much as before. The zone system of reckoning standard time was adopted in the United States in 1883 and in Australia in 1895. In the former country there are four zones: the Eastern, taking time from the meridian of 75° W. (5 hrs. slow on Greenwich time); the Central, with standard meridian 90° W. (6 hrs. slow); the Mountain, 105° W. (7 hrs. slow); and the Pacific, 120° W. (8 hrs. slow). There are three Australian zones: Queensland, New South Wales, Victoria, and Tasmania, with 150° E. (10 hrs. fast) as standard; South Australia, with 135° E. (9 hrs. fast); and Western Australia, with 120° E. (8 hrs. fast). Other standards adopted with reference to Greenwich are: 15° E. (1 hr. fast) for Mid-Europe; 22½° E. (1½ hrs. fast) for Cape Colony; 30° E. (2 hrs. fast) for Natal; 135° E. (9 hrs. fast) for Japan; and 172½° E. (11½ hrs. fast) for New Zealand. MERIDIAN, a. being on

the meridian or at midday; pertaining to the highest point. MERIDIONAL, a. *mĕ-rĭd'ĭ-ŏ-nal*, pertaining to the meridian; southerly; having a southern aspect. MERID'IONALLY, ad. *-lĭ*.

MERID'IAN: Miss., city, county-seat of Lauderdale county; on the Mobile & Ohio, the New Orleans & Northeastern, and the Southern railroads; about 90 miles east of Jackson. Meridian is one of the oldest places in the state. It was a Confederate supply depot during the civil war until 1864, when it was attacked by General Sherman. From Feb. 14 until the 20th he destroyed the store houses, railroads, and took possession of the supplies. The city is surrounded by fine farm land on which a large quantity of cotton is raised. The chief industrial establishments are cottonseed-oil mills, cotton mills, lumber mills, railroad shops, cotton-gins and cotton compresses. Meridian is the trade centre for a considerable section of country; large shipments of cotton and lumber are made annually. It is the seat of the East Mississippi Female College (M. E.), founded in 1867 and opened in 1869. It has the Lincoln School (Congregational) and the Meridian Academy (Methodist Episcopal South), both for colored students. Pop. (1910) 23,285.

MERIDIAN CIRCLE: in astronomy, an instrument used in observatories to combine the functions of a transit instrument and of the old mural circle. A vertical circle is carried on the axis of the transit instrument and revolves with it, its divisions being read by micrometer microscopes mounted solidly on one of the piers. In this way both co-ordinates of the position of a heavenly body, its right ascension and declination, are determined at the same meridian passage—a great saving of time over the old method with the instruments.

MERIDIAN (Miss.), EXPEDITION TO: in 1864, Jan., Gen. Sherman concentrated two divisions of 10,000 each at Vicksburg under Gens. McPherson and Hurlbut, and Feb. 3 marched eastward with the purpose of destroying Meridian, 150 miles distant, as a railroad centre, and possibly penetrating to Selma, Ala., or, if the opposing forces did not seem too strong at Mobile, to turn southward from Meridian and attempt the capture of that city. Gen. Sooy Smith was to co-operate with a cavalry force from Memphis; Gen. Dodge, in command at Pulaski, Tenn., was to hold Logan at Bellefonte, Ala., for a diversion toward Rome, Ga.; and Gen. Thomas was to demonstrate toward Dalton to prevent troops being sent by Gen. Johnston to Sherman's front.

Sherman entered Jackson on the 6th, after heavy skirmishing with cavalry. Decatur was reached on the 12th. Sherman arranged to spend the night at a farm house. By mistake the regiment on guard had moved forward. The house was attacked, and just as Sherman, his clerks and orderlies were climbing into a corncrib at

the back of the house to defend themselves, the regiment which had gone on by mistake came rushing back and saved Sherman and his headquarters force from capture.

Meridian was taken the 14th, the Confederate force, under Gen. Leonidas Polk, being much less than Sherman's, withdrawing toward Demopolis. The arsenal, extensive storehouses, and cantonments were burned. The work of destroying the railroads centreing at Meridian began on the 16th, 60 miles being rendered utterly useless to the north and east, and 55 miles toward Mobile. This destruction was of the most systematic and thorough character; 10,000 men worked at it for five days; 61 bridges and culverts, and more than a mile of trestles over swamps were burned; all rails were rendered useless. This object of the expedition was fully gained, as Meridian was not wholly restored as a railroad centre during the war. Thereafter, the transporting of supplies eastward from the state of Mississippi was seriously interrupted for a long time, and was greatly impeded up to the close of the war, while all military operations which required railroad facilities were rendered extremely difficult.

The expedition, however, was not as successful as had been hoped. The Confederates, by the exercise of great energy in the face of many difficulties, so strengthened Mobile as to forbid an advance in that direction. Sherman, not receiving the cavalry support under Gen. Sooy Smith which he had reason to expect from Memphis, was unable to push on to Selma, Ala., one of the great manufacturing cities and storehouses for military supplies of the Confederacy. Smith, in turn, had been unavoidably detained, and Sherman returned to Vicksburg, reaching its vicinity Feb. 26. His command had marched between 300 and 400 miles, had crossed Mississippi, and inflicted well-nigh irreparable military damage; but had been prevented from carrying out his full programme by Confederate activity in assembling forces in his extreme front.

MÉRIMÉE, *mā-re-mā'*, PROSPER: novelist, historian, and archæologist, great master of French style: 1803, Sep. 28—1870, Sep. 23; b. Paris; son of J. F. L. Mérimée, painter of distinction, and secretary to the Ecole des Beaux Arts. The son entered the College of Charlemagne, studied law, and early became acquainted with English and Spanish literature. The influence of Shakespeare, Calderon, and Goethe was then making itself felt in France, and the Romantic School, headed by Victor Hugo, was contending for possession of the stage against the classic traditions of Racine. Mérimée, a devotee of the new sect, published under a double disguise his first work, *Le Théâtre de Clara Gazul*, a collection of studies for the stage, professing to be translated from the Spanish by a certain Joseph L'Estrange. This work raised great expectations, which were never real-

ized. Mérimée did not become a dramatist, and one of these pieces failed when represented 1850. His next publication, also pseudonymous, *La Guzla, by Hyacinthe Maglanovitch,* was an effort to embody the spirit of the popular lays of Illyria and Montenegro. Mérimée then became a regular contributor to the *Revue de Paris* and the *Revue des Deux Mondes;* and after one or two more anonymous efforts, signed his name to *Tamango.* After the revolution of July, he entered public life, and before long was made Inspector of Historical Monuments. During all this time he continued to write for his favorite reviews a series of romantic tales, in which terrible, almost repulsive subjects are handled with wonderful realistic power, and in a style singularly clear, condensed, and vigorous. This series, in which the *Etruscan Vase* and the *Capture of the Redoubt* especially are noteworthy, culminated in *Colomba* (1841), written by him when fresh from Corsica and its tales of vengeance. After this, his greatest and (with the exception of *Arsène Guillot* and *Carmen*) his last romance, Mérimée applied himself to historical researches. The *Conspiracy of Catiline* and the *Social War,* studies of Roman history, preliminary to a Life of Cæsar, on which he is said to have been occupied many years, appeared 1844. In this year he was elected to the chair in the Academy vacated by the death of C. Nodier. His *History of Dom Pedro the Cruel* (1848), dedicated to the Countess of Montijo, mother of the Empress Eugénie, was translated into English (1850). After the fall of the Orleans dynasty, he was placed on the commission to draw up an inventory of the art treasures left by them in France. In 1854, he published his *False Demetrii,* an episode of early Russian history. Mérimée also translated from Pushkin and Nicolas Gogol. Among his latest writings were an introduction to Marino Vretro's *Poetry of Modern Greece* (1855); two brief articles in the *Revue des Deux Mondes* (1864); and *Lettres à une Inconnue* (1873; Eng. trans. 1874). Mérimée was made senator 1853; president of the commission for reorganizing the Bibliothèque Impériale in 1858: commander of the Legion of Honor 1860. He was also one of the ten *membres libres* of the Académie des Inscriptions.

MERINO, n. *mĕ-rē′nō* [Sp. *merino,* moving from pasture to pasture, as the sheep do which produce the wool: F. *mérinos,* a merino sheep]: important breed of sheep originally Spanish, now widely diffused through other countries, and constituting a great part of the wealth of Australia. The Merino has large limbs, and the male has large spiral horns, which do not rise above the head; the skin of the neck is loose and pendulous; the cheeks and forehead bear wool; the fleece is fine, long, soft, and twisted in silky spiral ringlets, abounding in oil, which attracts dust, so that it has generally a dingy appearance. The fleece is sometimes black, and black spots are

apt to appear in even the most carefully bred flocks. The Merino sheep fattens slowly, and owes its value altogether to the excellence of its wool. It has not been found profitable where the production of mutton is a great part of the object of the sheep-farmer.—The term merino is applied also to the fabric made from the wool of this sheep. See WOOLEN MANUFACTURE.

MERIONETH, *mĕ-rē-ŏn'ĕth* or *mĕr'ĭ-ŏn-ĕth:* county of Wales, bounded w. by Cardigan Bay, n. by the counties of Caernarvon and Denbigh; greatest length about 45 m., greatest breadth about 30 m.; 600 sq.m., or 385,291 acres: chief town Dolgelley. The coast s. of the town of Harlech rises into cliffs, is skirted by sands, and fringed by three dangerous sandbanks some distance out at sea. Merioneth is the most mountainous county in Wales, though its peaks do not rise to the height of some in Caernarvonshire. The chain comprising the highest peaks runs n.w. to s.e.; its summits are Arran Mowddy (2,955 ft.) and Cader Idris (q.v.). The county is watered by the Dee, which flows n.e. and by the Mawddach and the Dovey, which have a s.w. course. The soil is generally poor, and large tracts are unfit for profitable cultivation. Slate and limestone are largely quarried; a little lead and copper is mined; and of late gold has been found. Woolens and flannels are manufactured. Pop. (1901) 47,774.

MERISMATIC, a. *mĕr'ĭz-măt'ĭk* [Gr. *merismos,* division —from *meris,* a part]: taking place by division or separation, as into cells or segments.

MERISPORE, n. *mĕr'ĭ-spōr* [Gr. *meris,* a part; *spora,* seed]: in *bot.,* a cell capable of germination, formed by the division of an ascospore or a basidiospore.

MERISTEM, n. *mĕr'ĭ-stĕm* [Gr. *meristos,* separated, divisible—from *merīzo,* I divide into parts]: in *bot.,* tissue formed of cells which are all capable of dividing, and producing new cells; also called 'generative tissue,' or cambium.

MERIT, n. *mĕr'ĭt* [F. *mérite*—from L. *merĭtum,* desert, merit: It. *merito,* merit, desert]: goodness or excellence entitling to honor or reward; value or excellence; that which is earned or deserved; desert: V. to deserve, in a good or bad sense; to have a just title to; to earn. MER'ITING, imp. MER'ITED, pp.: ADJ. deserved. MERITORIOUS, a. *mĕr'ĭ-tō'rĭ-ŭs* [L. *merĭtōrĭŭs,* that brings in money—from *mĕrĕō,* I acquire, I earn]: praiseworthy; deserving of reward or fame. MER'ITO'RIOUSLY, ad. *-ŭs-lĭ.* MER'ITO'RIOUSNESS, n. *-nĕs,* state or quality of deserving a reward.

MERITHAL, n. *mĕr'ĭ-thăl* [Gr. *meris,* a portion; *thallos,* a young shoot, a bough]: in *bot.,* a term used for 'internode'; a term applied to the different parts of the leaf. MERITHALLI, n. plu. *mĕr'ĭ-thăl'ī,* the three principal parts of a plant—the *radicular merithal* corre-

sponding to the root, the *cauline* to the stem, and the *foliar* to the leaf.

MERIVALE, *mĕr'ĭ-vāl*, CHARLES: English historian and ecclesiastic: b. Barton Place, Devonshire, 1808, Mar. 8; d. Ely 1893, Dec. 27. He was educated at Cambridge, took orders in the English Church, was rector of Lawford, Essex, 1848-69, and dean of Ely from 1869. He published *The Fall of the Roman Republic* (1853), which forms the first part of his popular *History of the Romans Under the Empire* (latest ed. 1890); *General History of Rome* (1875); *Lectures on Early Church History* (1879); etc. Consult: *Autobiography and Letters* edited by his daughter (1899).

MERIVALE, HERMAN: English statesman and political economist; brother of Charles; b. Dawlish, Devonshire, 1806, Nov. 8; d. London 1874, Feb. 9. He was educated at Oxford, where he was professor of political economy 1837-42. He was under-secretary for the colonies 1848-59, becoming perpetual under-secretary for India in 1859. He wrote *Colonization and Colonies* (1841), a much valued work; *Historical Studies* (1865); *Memoirs of Sir Philip Francis* (1867).

MERIVALE, HERMAN CHARLES: English author: b. London 1839; d. 1906, Jan. 15. He was educated at Harrow and Oxford, became a barrister of the Inner Temple in 1864 and edited the *Annual Register* 1870-80. Among his publications are: *The White Pilgrim and Other Poems* (1875); *The Cynic* (1882); several plays; *The Whip Hand* (1884); *The Dove* (1888). He was a son of J. H. Merivale.

MERIVALE, JOHN HERMAN: English scholar and translator: 1779—1844; b. Exeter. He studied at St. John's College, Cambridge, and was called to the bar 1805. He contributed largely to Bland's *Collections from the Greek Anthology* (1813; second ed. 1833). He wrote *Poems Original and Translated* (1841).

MERIWETHER, DAVID, *mĕr'ĭ-wĕth-ẽr:* 1755—1822, Nov. 16; b. Virginia. He entered the continental army as lieutenant; and, 1779, was taken prisoner at the siege of Savannah. In 1785, he settled in Wilkes co., Ga., which he several times represented in the legislature; 1802-07, he served in congress, being elected to fill a vacancy. In 1804, Jefferson, whose earnest supporter he was, made him Indian commissioner to adjust the claims of the Creeks in Florida; 1817, he was a presidential elector, and served, the same year, with General Jackson and Governor McMinn of Tennessee, on the commission which made the treaty with the Cherokees, 1817, July 8, by which a large and valuable tract in Georgia was ceded to the United States. In 1821 he was again presidential elector. He died near Athens, Ga.

MER'IWETHER, LEE: American lawyer, social reformer and author: b. Columbus, Miss., 1862, Dec. 25.

Having obtained a secondary education at Memphis, Tenn., he there published the *Free Trader* with a brother, Avery, in 1881-3, and in 1885-6 toured Europe afoot from Gibraltar to the Bosporus for study of the condition of continental workingmen and of the protective tariff. He was appointed by the secretary of the interior to write for the United States Labor Bureau a report on the *Condition of European Labor*, published in the annual report of the bureau for 1886. In 1886-9 he was employed as a special agent of the department of the interior, for which he made investigations of labor in the United States and the Hawaiian Islands, and in 1891 visited the island prisons of the Mediterranean. He was admitted to the bar in 1892, and in 1893 entered practice at St. Louis. In 1889-90 and 1895-6 he was labor commissioner of Missouri. His reports on municipal government and street railway franchises led to his nomination in 1897 for the mayoralty of St. Louis on the Democratic ticket. He was defeated at that time and also in 1901 and 1905, when he was a candidate of the Public Ownership party. Besides his various reports, he has published *A Tramp Trip: How to See Europe on Fifty Cents a Day* (1887); *The Tramp at Home* (1890); *Afloat and Ashore on the Mediterranean* (1892); *Miss Chunk* (1899); *A Lord's Courtship* (1900), and other works.

MERK, n. *mėrk:* an old Scotch silver coin, value 13⅓*d.* sterling.

MERL, or MERLE, n. *mėrl* [F. *merle*—from L. *merŭlă*, a blackbird]: in *Scot.*, the blackbird (q.v.).

MERLE D'AUBIGNÉ, *mārl dō-bēn-yā'*, JEAN HENRI: popular historian of the Protestant reformation: 1794, Aug. 16—1872, Oct. 21; b. Eaux-Vives, near Geneva, Switzerland. He studied there and at Berlin—under Neander—and subsequently became pastor of the French Protestant Church in Hamburg. After five years, he went to Brussels, and became chaplain of King William, who, after the revolution of 1830, invited him to Holland, as tutor to the Prince of Orange. Merle declined, and returning to Geneva, took part in the institution of a new college for propagation of orthodox theology, in which he was appointed professor of church history. His *Histoire de la Réformation au Seizième Siècle* (1835 et seq.) is written with utmost vivacity, and is sometimes eloquent. Its popularity has been immense in England and the United States as well as on the continent of Europe. Among Merle's other writings are—*Le Luthéranisme et la Réforme* (Par. 1844); *Germany, England, and Scotland* (1848); *Le Protecteur, ou la République d'Angleterre aux Jours de Cromwell* (1848); *Trois Siècles de Lutte en Ecosse* (1850); *Caractère du Réformateur et de la Réformation de Génève*, and *Histoire de la Réformation en Europe au Temps de Calvin* (1862-77). He died at Geneva.

MERLIN, n. *mėr'lĭn* [Gael. *murluin*, a fish-basket]: in *Scot.*, a fish-basket.

MERLIN, n. *mėr'lĭn* [OF. *esmerillon* and *emerillon:* It. *smeriglio*], (*Falco œsalon* or *Hypotriorchis œsalon*): small species of hawk, one of the smallest of *Falconidæ*, 11 in. to 12½ in. in length, but very bold and powerful, and possessing all the characters of the true falcons, with the distinction of large hexagonal scales on the front of the tarsi. It is of a bluish ash color above; reddish yellow on the breast and belly, with longitudinal dark spots, the throat of the adult male white. The wings reach to two-thirds of the length of the tail. It builds its nest on the ground, and is fond of localities where large stones are plentiful, on which it is often seen perched, and is therefore often called the *Stone Falcon*. It is common in parts of Europe, is found in Asia very frequently, and extends southward in Africa, even to the Cape of Good Hope. It was of great repute in the days of falconry, being very easily trained, and flying readily at its quarry. It was therefore often used for taking partridges and wood-pigeons. It is a very lively bird, and often utters a harsh scream. It usually flies low and very rapidly, threading its way, if necessary, through branches and leaves, but it will also follow its prey in mounting upward to a great height.

MERLIN, *mėr'lĭn:* ancient Welsh prophet and enchanter, whose date is conjecturally assigned to the period of decline of the native British power in its contest with the Saxon invaders. Both the Cambrian and the Strathclyde Britons boasted of a Merlin who was, in all probability, the same personage decked out in different legendary guise.—The Cambrian Merlin, called Merlin *Emyrs* or *Ambrosius*, is said by Geoffrey of Monmouth, in his *Historia Brittonum*, to have lived in the 5th c., to have sprung from the intercourse of a demon with a Welsh princess, and to have displayed miraculous powers from infancy. He is alleged to have been the adviser of King Vortigern, and subsequently of Ambrosius, Uterpendragon, and the great King Arthur. He is often alluded to by the earlier poets, especially Spenser, in his *Fairy Queen*, and figures in Tennyson's *Idylls of the King*. A collection of prophecies attributed to him appeared in French (Paris 1498), in English (Lond. 1529 and 33), and in Latin (Venice 1554); and their existence is traceable at least as far back as the time of the poet Lawrence (about 1360).—The Strathclyde, or the *Scottish* Merlin, called Merlin the Wyllt, or Merlin Caledonius, is placed in the 6th c., and appears as a contemporary of St. Kentigern, Bishop of Glasgow. His grave is still shown at Drummelzier on the Tweed, where, in attempting to escape across the river from a band of hostile rustics, he was impaled on a hidden stake. A metrical life of him extending to more than 1,500 lines, professedly based on Armoric materials, and incorrectly ascribed to Geoffrey

of Monmouth, was published by the Roxburghe Club 1830. His prophecies—published at Edinburgh 1615—contain those ascribed to the Welsh Merlin.

MERLON, n. *mėr′lŏn* [F. and Sp. *merlon*]: in *fort.*, the part of an embattled parapet between two embrasures, having a usual length of 15 to 18 ft.

MERMAID, n. *mėr′mād* [AS. *mere*, a lake; *mægd′*, a maid: F. *mer;* L. *mărĕ*, the sea, and Eng. *maid:* Ger. *meer;* W. *mor*, the sea]: fabled sea-woman, the upper half in the shape of a woman, and the lower forming the tail of a fish. MERMAN, n. *mėr′măn*, the male of mermaid.—The *Mermaid* is represented usually with the upper parts resembling those of a human being, generally of a woman—though the *Merman* also is sometimes heard of—while the body terminates in the semblance of a fish. There is an evident affinity between the stories concerning mermaids and those concerning the sirens and tritons, perhaps also the nereids, of the ancients. The probability is that these stories originated in the appearance of seals, walruses, and perhaps still more of the herbivorous cetacea, in regions where they are rare, or to persons unaccustomed to see them. Many of the stories concerning mermaids belong to the northern parts of the world, where the herbivorous cetacea are rare, and perhaps some of the solitary seals have often given occasion to them. But the herbivorous cetaceans do occasionally wander into the British, and probably even into more northern seas. Sir James Emerson Tennent says concerning the Dugong (q.v.): 'The rude approach to the human outline observed in the shape of the head of this creature, and the attitude of the mother while suckling her young, holding it to her breast with one flipper, while swimming with the other, holding the heads of both above water; and when disturbed, suddenly diving and displaying her fish-like tail—these, together with her habitual demonstrations of strong maternal affection, probably gave rise to the fable of the mermaid; and thus that earliest invention of mythical physiology may be traced to the Arab seamen and the Greeks, who had watched the movements of the dugong in the waters of Manaar.' There is possibility of the existence in the ocean of cetaceans not yet known to naturalists. In the old and vulgar superstition, the mermaid was a being of supernatural knowledge, who was capable of human loves and hates and of being wedded to a human lover; her life in the sea was a succession of delights, but her association with man usually brought some evil.—The mermaid is a not unfrequent heraldric bearing. In the heraldry of France, she is called a Siren, and in Germany she is occasionally furnished with two fishy tails,

MERMAID'S GLOVE (*Halichondria palmata*): largest of British sponges. It grows in deep water, and is sometimes two ft. in height. It receives its name from the somewhat finger-like arrangement of its branches. It is not slimy, and has a very porous surface; rough, with myriads of minute fragile spieulæ. Its eolor is yellowish.

MEROBLASTIC, a. *mĕr′ō-blăs′tĭk* [Gr. *mĕros*, a part; *blastos*, a bud]: applied to an ovum whose vitellus is only partially segmented, as distinguished from *holoblastic*, whieh denotes an ovum whose vitellus is wholly segmented: see HOLOBLASTIC.

MERODACH, *mē-rō′dăk* or *mĕr′o-dăk:* a deity of Babylon, son of Êa; in the earlier mythology, a herald and champion of the gods; later, the guardian of the empire. M. is coupled with Bel or Belus, Jer. l. 2 (see BAAL); and it is conjeetured that in later times the distinetion between the two had been lost, and that to M. were ascribed the qualities and powers of the far mightier god. Nebuchadnezzar addresses M. as though holding this view of him. His name frequently formed a part of Babylonian proper names.

MER′ŎË: see ETHIOPIA.

MEROM, *mē′rom*, LAKE; or LAKE HULEH, *hô′lĕh:* triangular lake in n. Palestine, an expansion of the upper Jordan; 11 m. n. of the Lake of Galilee; about 6 m. long, 3½ m. wide, 11 ft. deep—though its dimensions vary according to the rains. It was the scene of Joshua's defeat of the Canaanite kings (Josh. xi. 5, 7). It is surrounded by marshes, and large areas of it are eovered with yellow and white water lilies and Egyptian papyrus. The modern Arab name is Hûleh—applied also to the distriet near.

MEROPE, n. *mĕr′o-pē* [L.—from Gr. *Meropē*]: in *class. myth.*, one of the Pleiades, who were regarded as daughters of Atlas: see PLEIADES.

MER′OPIS: island of the Grecian Archipelago: see COS.

MEROPS, n. *mē′rŏps* [L. and Gr. *merops*, the bee-eater]: the bee-eater; a bird of the genus *Merop′ĭdæ*, living ehiefly upon the various species of bees and wasps. MEROPIDÆ: see BEE-EATER.

MEROSTOMATA, n. plu. *mē′rō-stŏm′ă-tă* [Gr. *mēros*, the upper part of the thigh; *stoma*, a mouth]: an ord. of Crustacea, embraeing the king-crabs or horseshoe crabs, in whieh the appendages placed round the mouth, and performing the office of jaws, have their free extremities developed into walking or prehensile organs.

MEROVINGIANS, *mē-rō-vĭn′jĭ-anz:* first dynasty of Frankish kings in Gaul. The name is derived from Merwig or Merovaens, who ruled about the middle of the 5th c., having united a few tribes under his sway. His grandson, Chlodwig or Clovis (q.v.), greatly extended his dominions, and on his death, divided his kingdom among his four sons, one of whom, Chlotar or Clotaire I., re-

united them under his own sway 558. On his death, 561, the kingdom was again divided into four parts—Aquitaine, Burgundy, Neustria, and Austrasia. His grandson Clotaire II. again united them 613; but after his death, 628, two kingdoms, Neustria and Austrasia, were formed, in both of which the Merovingian kings retained merely nominal power, the real power having passed into the hands of the mayors of the palace.—The dynasty of the Merovingians terminated with the deposition of Childeric III., 752, and gave place to that of the Carlovingians (q.v.) or Karlings. Merovingian should be spelt *Merwings*.—The chief authority for the early history of the Merovingians is Gregory of Tours. See Thierry's *Récits Mérovingiens* (1839), Montenon, *La Dynastie Mérovingienne* (1863); and German works by Löbell (1869), Richter (1873), and Arndt (1874).

MERRIAM, *mĕr'ĭ-am*, Clinton Hart: American biologist and author: b. New York City 1855, Dec. 5. He was graduated from Yale in 1877 and from the College of Physicians and Surgeons in New York in 1879, and practiced medicine, 1878-85. He was United States Bering Sea commissioner in 1891 and visited Alaska in the interest of fur seal investigations. He has held various commissions from the government in the field of biology and has made explorations in its interest in the far West. He has written: *Birds of Connecticut* (1877); *Mammals of the Adirondacks* (1882-4); *Results of Biological Survey of San Francisco Mountain Region and Desert of Little Colorado in Arizona* (1890); *Flora and Fauna of the Death Valley Expedition* (1893); *Life Zones and Crop Zones of the United States* (1898); etc.

MERRIAM, Henry Clay, A.M.: American soldier: b. Houlton, Me., 1837, Nov. 13. He was graduated from Colby University, and began the study of law; but in 1862 entered the Union army as captain in a Maine regiment. He was at the battle of Antietam in 1862, and organized the colored troops in 1863, being lieutenant-colonel of the Louisiana Native Guard (a negro regiment) at the close of the war; he led the assault on Fort Blakely 1865, Apr. 9, and obtained a medal of honor from Congress for gallant conduct. In 1866 he was appointed major in the regular United States army, and rose to the rank of brigadier-general in 1897 and major-general of volunteers in the Spanish war, 1898. He served in many expeditions against the Indians, and protected American citizens in the valley of the Rio Grande in the revolutionary troubles (1873-6). In 1898 he was commander of the departments of the Columbia and California, and organized, equipped and forwarded the troops to the Philippines; and in 1899 was sent to the Philippines in command of the army of occupation. In 1900, Jan., he was placed in command of the Department of the Colorado, and in 1901 was retired from

active service. He is the inventor of the Merriam infantry pack.

MERRIAM, WILLIAM RUSH: American financier: b. Wadham's Mills, N. Y., 1849, July. He was graduated from Racine College, Wisconsin, in 1871 and entered the First National Bank of St. Paul, where he was cashier in 1873. In 1880 he was president of the Merchants' National Bank there and in 1882 became a member of the state legislature of Minnesota and was speaker in 1886. He was elected governor of Minnesota in 1889 and was director of the United States census in 1898-03.

MERRICK, *mĕr'ĭk*, LEONARD: English novelist: b. Belsize Park, London, 1864, Feb. 21. He was educated at Brighton College, and among his novels, several of which have been reprinted in this country, are: *Mr. Bazalgette's Agent; The Man Who Was Good; Cynthia: a Daughter of the Philistines; When Love Flies Out of the Window; Conrad in Quest of His Youth; The Quaint Companions;* etc. He is also the author of several plays.

MERRIFIELD, *mĕr'ĭ-fēld*, WEBSTER, A.M.: American educator: b. Williamsville, Vt., 1852, July 27. He was graduated from Yale in 1877 and was an instructor there 1879-83. From 1884 to 1891 he was professor of Greek in the University of North Dakota, professor of political economy, 1891-1903, and president of the institution since 1891.

MERRILL: city and county seat of Lincoln co., Wis.; on the Wisconsin river, and on the Chicago, Milwaukee & St. Paul railroad; about 145 m. n. of Madison. It was settled in 1875 and incorporated in 1880. It is in a part of the state where the chief industries are connected with lumbering. Merrill has manufacturing establishments for shingles, laths, planed lumber, sawed lumber, sash, doors, and blinds, clapboards, lumber for interior finish, flooring, etc. It has a high school, an opera house, a courthouse which cost about $100,000, and the T. B. Scott Public Library. Pop. (1910) 8,689.

MERRILL, *mĕr'ĭl*, GEORGE EDMANDS, A.M., D.D., LL.D.: American Baptist clergyman and educator: b. Charlestown, Mass., 1846, Dec. 19; d. Hamilton, N. Y., June 11. He was graduated from Harvard in 1869, and from the Newton Theological Seminary in 1872. Entering the Baptist ministry, he was pastor at Springfield, Mass. (1872-7); at Salem, Mass. (1877-85); at Colorado Springs (1885-7); and at Newton, Mass. (1890-9). In 1899 he was called to the presidency of Colgate University, Hamilton, N. Y., where his administration was of a constructive nature, improving the standard and awakening interest in many new lines of college activity. He wrote *Story of the Manuscripts* (1881); *Crusaders and Captives* (1890); *The Reasonable Christ* (1893); *The Parchments of Faith* (1895); etc.

MERRILL, Lewis: American soldier: b. New Berlin, Pa., 1834, Oct. 28; d. Philadelphia 1896, Feb. 27. He was graduated from West Point in 1855, and at the outbreak of the Civil war was appointed colonel of a volunteer cavalry regiment and served with distinction through the war. He was active in warfare with the Indians and performed the notable service of breaking up the Kuklux Klan in 1868, which was recognized by Congress after some delay by promotion to the rank of lieutenant-colonel of cavalry.

MERRILL, Selah, A.M., D.D., LL.D.: American Congregationalist clergyman and archæologist: b. Canton Centre, Conn., 1837, May 2. He was educated at Yale and at the New Haven Theological Seminary and was ordained to the ministry in 1864 when he entered the Federal army as chaplain. He held pastorates in Leroy, N. Y., and in San Francisco, and was for a time professor of Hebrew at Andover Theological Seminary. In 1882-6, 1891-4 and 1898-1907 he was United States consul at Jerusalem and made valuable archæological researches and discoveries there. Since 1907 he has been consul at Georgetown, Guiana. He has written: *East of the Jordan* (1881); *Galilee in the Time of Christ* (1881); *The site of Calvary* (1885); *Ancient Jerusalem* (1906); etc.

MERRILL, Stephen Mason, D.D.: American Methodist bishop: b. Jefferson co., Ohio, 1825, Sep. 16; d. Keyport, N. J., 1905, Nov. 12. He studied for the ministry and was ordained by the Ohio Conference in 1846, and in 1868-72 was editor of the *Western Christian Advocate*. In 1872 was appointed bishop. He published: *Christian Baptism; Union of American Methodism; Sanctification* (1901); *Miracles* (1902).

MERRILL, William Emery: American military engineer: b. Fort Howard, Wis., 1837, Oct. 11; d. near Edgefield, Ill., 1891, Dec. 14. He was graduated from West Point in 1859 and for a year prior to the outbreak of the Civil war was assistant professor in engineering at West Point. He went to the front in 1861, and served with distinction at Yorktown, Chickamauga, Missionary Ridge and other famous battles and in 1864-5 had charge of the railroad which supplied the armies in Georgia and Tennessee and was brevetted colonel for his services. After the war he served as chief engineer on the staff of General Sherman and was engaged in western surveys and the improvement of rivers. He was in charge of the improvement of the Ohio river at the time of his death, which occurred on a railroad train. He wrote *Iron Truss Bridges for Railroads* (1870) and *Improvement of Non-Tidal Rivers* (1881).

MERRIMAC, *mĕr'ĭ-măk*, River: rising in New Hampshire, flowing s. into Massachusetts, and then e. and n.e. into the Atlantic ocean at Newburyport; length

about 120 m. It receives several small tributaries, and has numerous falls, affording immense water-power, on the principal of which are the manufacturing towns of Nashua and Manchester, N. H., and Lowell and Lawrence, Mass. It is navigable 15 m. to Haverhill.

MERRIMAN, MANSFIELD, PH.D.: American civil engineer: b. Southington, Conn., 1848, Mar. 27. He was graduated from Yale in 1871 and in 1872-3 was assistant engineer in the United States corps of engineers. He was instructor in civil engineering at Sheffield Scientific School, Yale, in 1875-8 and professor of civil engineering at Lehigh University, 1878-1907. In 1880-5 he was also a member of the United States Coast and Geodetic Survey. He is a member of many scientific societies, and has published: *Theory of Continuous Bridges* (1876); *Mechanics and Materials* (1885); *Treatise on Hydraulics* (1889); *Precise Surveying and Geodesy* (1899); *Elements of Sanitary Engineering* (1906); etc.

MERRIMAN, TITUS MOONEY, A.M.: American Baptist clergyman: b. Charleston, P. Q., 1822, Apr. 23. He was graduated from Canada Baptist College, Montreal (now McMaster Hall, Toronto), in 1844, served in the United States Christian Commission during the Civil war, and became a naturalized citizen of the United States in 1882. He was a professor at Laselle Seminary, Auburndale, Mass., 1864-95. He published *William, Prince of Orange* (1874); *Pilgrims, Puritans and Roger Williams Vindicated* (1892); *Ecclesia: or Christ's First Church in Jerusalem* (1900); etc.

MERRITT, *mĕr'ĭt*, WESLEY: b. New York, 1836, June. He graduated from West Point Military Academy 1860, July, was connected with the dragoons, promoted first lieutenant, 1861, May, and captain 1862, Apr. In 1863, June, he became brigadier-general of volunteers and was brevetted major for brilliant service at the battle of Gettysburg. In 1863-4 he participated in the Virginia campaigns. For gallant service in various engagements he was brevetted lieutenant-colonel and colonel in the army and major-general of volunteers, and afterward was commissioned major-general of volunteers to date from the battle of Five Forks. He was appointed by General Grant one of the three commissioners to act upon the surrender of the Army of Northern Virginia. After the Civil war he was chief of cavalry in different departments, and for several years was actively engaged in protecting the frontier against Indian raids; 1882 became superintendent of the military academy at West Point; 1887 was promoted brigadier-general in the regular army and succeeded General Wilcox in command of the department of Missouri. Being appointed to command the United States army in the Philippines during the Spanish-American war (1898), Merritt sailed for

Manila June 28, and landing at Cavité, Manila harbor, July 29, at once assumed direction of affairs. Forcing the fighting, he quickly brought about the surrender of the Spaniards, and entered the city of Manila Aug. 13. Two weeks later he sailed for Paris, where he was to meet the peace commissioners and give the conference the benefit of his views on the general state of the Philippine Islands. He arrived in that city Oct. 3, and appeared before the commission on the 5th. On his return to the United States he was appointed commander of the Department of the East; retired 1900, June 16.

MERRY, a. *mĕr'rĭ* [AS. *mirig*, merry, pleasant: Lap. *murre*, delight: Gael. *mir*, to sport; *mireag*, sport]: loudly cheerful; gay of heart; causing laughter or mirth; delightful; in *OE.*, sweet or pleasant; active or brisk. MER'RILY, ad. *-lĭ*, gayly; cheerfully; with mirth. MER'RINESS, n. *-nĕs*, or MERRIMENT, n. *-mĕnt*, gayety, with laughter or noise; hilarity. MERRY-ANDREW, *mĕr'-rĭ-ăn'drô* [supposed to have originated from a facetious physician in the time of Henry VIII.]: one who makes sport for others; a buffoon or clown; one who attended a quack doctor to collect a crowd. To MAKE MERRY, to be jovial; in *Scrip.*, to feast. MERRYMEETING or -MAKING, a meeting for mirth; a festival. MERRY-THOUGHT, the forked bone of the breast of a fowl, which, pulled and broken between two young people, is supposed to betoken priority of marriage to the one holding the larger piece.—SYN. of 'merry': blithe; blithesome; lively; airy; cheerful; sprightly; gleeful; vivacious; joyous; jocund; sportive; mirthful.

MERRY, ROBERT: English poet and eccentric: b. London 1755, Apr.; d. Baltimore, Md., 1798, Dec. 14. He was educated at Christ's College, Cambridge, and studied law at Lincoln's Inn; and about 1784 settled in Florence, where he was made a member of the Della Crusca Academy, and wrote much sentimental verse. He returned to England in 1787; printed some of his verse, which was sarcastically praised by Walpole and was the butt of Gifford's *Baviad;* and in 1791 married an actress. In 1796 they came to America, where his wife acted with great success and where Merry was regarded as a very superior poet. *The Abbey of St. Augustine*, a play by him, was acted in Philadelphia in 1797.

MERRY, WILLIAM WALTER, D.D., D.LITT.: English Anglican clergyman and classical scholar: b. Worcestershire 1835, Sep. 6. He was educated at Oxford and has been rector of Lincoln College there from 1884. In 1861 he became vicar of All Saints Church, Oxford, was select preacher to the University 1878-9, and again in 1889, and public orator in the University in 1880. He is widely known for his editions of the classics published by the Clarendon Press and including the *Odyssey* (Books I. to

XII., 50th thousand; XIII. to XXIV., 15th thousand); and the plays of Aristophanes. He is the author of *The Greek Dialects* (1875).

MERSEY, *mėr'zĭ:* important river of England, separating in its lower course, the counties of Cheshire and Lancashire. Its origin is in the junction of the Thame and Goyt, on the borders of Derbyshire, e. of Stockport. It flows w.s.w., and is joined on the right by the Irwell from Manchester, at which point it becomes navigable for large vessels. Besides the Irwell, the chief affluents are the Bollin and the Weaver, from Cheshire. At its junction with the Weaver, the Mersey expands into a wide estuary, which forms the Liverpool channel, about 16 m. long, 1 to 3 m. broad; opposite Liverpool it is 1¼ m. in width, with considerable depth at low water. It is much obstructed by sandbanks; but an excellent system of pilotage renders the navigation comparatively secure. Entire length of the Mersey with its estuary, nearly 70 m.

MERTHYR-TYDVIL, *mėr'thėr-tĭd'vĭl,* W. *mėr'thėr-tŭd'vĭl:* market town of S. Wales, on the n. border of the county of Glamorgan, abutting on the county of Brecknock. It is surrounded by lofty hills, and is on the river Taff, 500 ft. above sea-level, 24 m. from its mouth and port at Cardiff; and it includes the junctions of the greater and lesser Taff, the Morlais, and the Dowlais, streams which here unite to constitute the main river. Merthyr-Tydvil is the seat of the iron trade of Glamorgan, as represented by the great works at Dowlais, Cyfarthfa, and Plymouth, and in a less degree at Penydarren. It has also large collieries, and is famed, with Aberdare, for the excellence of its steam coal. From about 1835 the manufacture of finished iron, chiefly rails, merchant-bars, girders, and ship-plates, grew rapidly; of late, steel is very largely produced. The exports of coal are considerable, but the chief consumption is within the works. The population are directly dependent upon the iron-works, there being no other trade or manufacture. Railways branch from Merthyr-Tydvil to Brecon, to Swansea, to Cardiff and Penarth, and to Newport and Hereford. Dowlais contains some fine public buildings, but Merthyr-Tydvil is deficient in this respect. Though a busy place, it has not a fine appearance, having risen very rapidly with the local trade, and having attained nearly its present dimensions before it was under any but the ordinary parochial government. There are, however, signals of improvement. It is well supplied with water, and the infantile mortality, long extraordinary, is now reduced. The people, chiefly Welsh, are industrious, and orderly. The place is said to take its name from the martyrdom here of a female British saint, Tydvil or Tydfil. Pop. about 70,000.

MERTON COLLEGE, *mėr'ton*, OXFORD: the House of the Scholars of Merton, the model of all the secular colleges, was founded first in Maldon in Surrey by Walter de Merton, Bp. of Rochester, and Lord High Chancellor, 1264, for the maintenance of 20 scholars in the schools of Oxford, and of a warden and three or four ministers of the altar, who were to manage the property. Before 1274, he transferred his warden and ministers to Oxford—thereby not only founding his own college, but contributing in no small degree to fix the university in its present locality. The fellows were to be as many as the means of the house could maintain, and after some changes, this number was fixed by Abp. Laud at 24. They were to be elected first and chiefly from the founder's kin; but this was from an early period evaded, and the commissioners of 1852 speak of 'a common belief in the university that the elections to fellowships at Merton were formerly determined by personal interest.' In 1380, Dr. Wylliot, Chancellor of Exeter, endowed 12 *portionistæ*, or postmasters as they are now called, equivalent to the scholars of other colleges; and 1604, John Chamber, fellow of Eton, endowed two more, restricted to foundationers from Eton. By the ordinances under 17 and 18 Vict. c. 81, considerable changes were made—six fellowships were suspended, of which two were assigned to increase the postmasterships, etc., and four to the endowment of the Linacre professorship of physiology, of value £800 per annum. The remaining 18 were thrown open, and not to exceed £250 per annum, exclusive of rooms, until the original number of 24 was restored. The number now being completed, they have reached their limiting value of £300. Sixteen postmasterships, and four scholarships, each of the value of £80 a year, are open without restriction; two postmasterships are thrown open in default of candidates from Eton. This college possesses 18 benefices.

MERU, *mā'rû*, in Hindu Mythology: fabulous mountain in the centre of the world, 80,000 leagues high; most sacred of all mythical mountains, the abode of Vishnu, and endowed with all imaginable charms.

MERULIDÆ, *mē-rô'lĭ-dē*, or TURDIDÆ, *tėr'dĭ-dē:* family of birds of order *Insessores*, sub-order *Dentirostres*, having arched and compressed bills, which are pointed and notched, but not strongly. The species are very numerous, and very widely distributed over the globe, some in cold and some in warm climates. Some are migratory; a few species are gregarious at all seasons, many are gregarious only in winter. They generally build their nests in trees. They feed chiefly on soft animal and vegetable substances, as berries, insects, and worms. Many are birds of very sweet song; some are remarkable for their imitative powers. To this family belong thrushes (among which are reckoned the blackbird, redwing, fieldfare, ring-ouzel, etc.), orioles, mocking-birds, dippers, etc.

MERV, *mĕrv:* district of central Asia, in W. Turkestan, on the borders of Iran and Turan; mostly an oasis in a desert; about 250 m. from Herat, 360 m. s.e. of Khiva, 65 n. of the Afghan frontier, and 12 m. e. of the Murghab river. According to O'Donovan, who spent six months there, M. is not a town, but a collection of small Turkoman settlements, scattered over an oasis, 60 m. long by 40 broad. The largest settlement, one of 1,000 huts and tents, is near a fort called Koushid Khan Kala, the present capital. M. was taken into possession by Russia 1884, an act which has excited British apprehension as an advance toward Herat the Key of India. The situation has always been regarded as one of strategic importance, and its recent occupation seems a part of a far-reaching Russian plan. The inhabitants are rude and wild; they are Turcomans of the Tekke tribe. On the banks of the rivers are ruins of ancient and powerful cities. See Marvin's *Merv, the Queen of the World* (1880); and O'Donovan's *The Merv Oasis*, 2 vols. (1882).

MERYCOTHERIUM, n. *mĕr′ĭ-kō-thē′rĭ-ŭm* [Gr. *mēru′kō*, I ruminate; *therĭŏn*, a beast]: in *geol.*, a huge ruminant found along with the mammoth and rhinoceros in the Drift or Upper Tertiary beds of Siberia—allied to the double-humped camel.

MESA, n. *mā′za* [Sp.—from L. *mensa*, a table]: a high plain or table-land; especially a table-land of small extent rising abruptly from a surrounding plain; a term frequently used in that part of the United States bordering on Mexico.

MESAGNA, *mā-sân′yâ:* town of the province of Lecce, s. Italy, 27 m. n.w. of Lecce. The district around is fruitful. Pop. 8,500.

MÉSALLIANCE, n. *māz′ăl-lĭ-ângs′* [F. *mésalliance*]: the French spelling of MISALLIANCE, which see.

MESCAL, n. *mĕs′kal* [Sp.]: a strong intoxicating spirit, distilled from pulque, the fermented juice of the *Agave Americana* of Mexico.

MESCALA, *mĕs-kâ′la:* river, rising in s.e. Mexico near Puebla, flowing w. and s. 400 m. into the Pacific at the port of Zacatula. It is named in successive parts of its course, the Atoyac, Rio Pablano, Rio da las Balsas, and Zacatula.

MESDAMES, n. plu. *mĕz′dăms* in Eng., but *mā-dâm′* in F.—the plu. of *madame*.

MESEMBRYACEÆ, *mē-sĕm-brī-ā′sē-ē*, or FICOIDEÆ, *fī-koyd′ē-ē:* natural order of exogenous plants, both herbaceous and shrubby, but all succulent. As defined by some botanists, it includes the orders *Tetragoniaceæ*, *Sesuviaceæ*, etc., of others. Of the more restricted M., about 400 species are known, a few of which are natives of s. Europe; the greater number belong to s. Africa and the South Sea Islands.—The Ice Plant (q.v.) is of this order. The leaves of some species, when burned, yield soda in great abundance; large quantities of ba-

rilla are made from them in the Canary Islands, in Spain, and in Egypt. The seeds of some, e.g., *mesembryanthemum crystallinum* (the ice plant) and *M. geniculiflorum*, are ground into flour for bread. *M. geniculiflorum* is used as a pot-herb in Africa. The fruit of *M. edule* (Hottentot's fig) is eaten in South Africa, and that of *M. æquilaterale* (pig's-faces) in Australia.—*M. emarcidum* is called *Kou* by the Hottentots, who beat and twist the whole plant, allow it to ferment, and chew it like tobacco.

MESEMBRYANTHEMUM, n. *mĕs-ĕm'brĭ-ănth'ĕ-mŭm* [Gr. *mesēm'brĭă*, mid-day; *anthĕmon*, a flower]: a genus of beautiful and well-known succulents, among which is *M. crystal'lĭnum*, or ice-plant, remarkable for ice-like vesicles covering its surface, ord. *Mesembryācĕæ* (q.v.).

MESENTER'IC DISEASE: disease of the mesentery (q.v.), or the broad fold of peritoneum (the great serous membrane of the abdomen), surrounding the jejunum and the ileum, and attached posteriorly to the vertebral column. Its breadth between the intestinal and vertebral borders is about 4 in.; its attachment to the vertebral column is about 6 in. in length, and its intestinal border extends from the duodenum to the end of the small intestine. It serves to retain the small intestines in their place, while allowing the necessary amount of movement; and it contains between its layers the mesenteric vessels, the lacteal vessels, and mesenteric glands. The glands are 100 to 150 in number, and are about the size of an almond. They exert an organizing action on the contents of the lacteals, the chyle being more abundant in fibrine and in corpuscles after it has passed through them. Hence, it is obvious that disease of these glands must always seriously affect the process of assimilation. The most important affection of these organs is tuberculous in nature, which gives rise to the disease known as *tabes mesenterica*, a disease most common in childhood, but confined to no period of life. In the great majority of cases it is associated with, and often marked by, other results of tuberculosis, such as pulmonary consumption, tuberculous peritonitis, Pott's disease of the spine, etc.; but sometimes the mesenteric glands seem almost exclusively affected, in which case the disease becomes sufficiently distinct to allow of easy detection. The leading symptoms are acceleration of the pulse, occasional fever, especially toward evening, loss of color and flesh, derangement of the digestive organs (constipation or diarrhea, and occasional vomiting), a steady pain in the region of the navel, increased by pressure; but perhaps the most characteristic symptom is tumefaction and hardness of the abdomen, with general emaciation. The enlarged glands can sometimes be detected by a careful examination with the hand, especially in advanced cases. The progress of the disease is generally slow, but at

length hectic fever sets in, the emaciation becomes extreme, dropsical effusion appears, and the patient dies exhausted, if not cut off by some acute inflammation.

The treatment is in the main the same as that of any other form of tuberculosis, namely, the administration of cod-liver oil, or, if the stomach is too irritable to bear that medicine, of iodide of iron, combined with some bitter infusion, the bowels being at the same time carefully attended to. The application of iodine ointment to the abdomen is often of great service. When the disease has advanced to a considerable extent, remedies are of little use, except to palliate some of the more urgent symptoms.

Independently of the disease above noticed, inflammation of these glands is not uncommon, when the mucous membrane of the small intestine is ulcerated, as, for example, in typhoid fever. In this case the inflammation is transitory and the swelling of the glands subsides as the typhoid lesions in the intestine get well.

MESENTERY, n. *měz'ĕn-tėr-ĭ* [Gr. *mesenter'ĭŏn*—from *mesos,* middle; *enteron,* intestine]: a membrane in the cavity of the abdomen which serves to retain the intestines and their appendages in their position: it is connected to the middle portion of the small intestines. MES'ENTER'IC, a. *-tĕr'ĭk,* belonging to the mesentery. MESERAIC, a. *měz'ėr-ā'ĭk* [Gr. *mesaraion,* mesentery, the middle of the bowels]: belonging to the mesentery.

MESH, n. *mĕsh* [Lith. *mazgas,* a knot; *megsti,* to knit: Ger. *masche,* a noose: AS. *maesce;* Dan. *maske,* a mesh: Dut. *masche,* a blot, a stain]: one of the openings between the threads of a net: V. to catch in a net; to ensnare. MESH'ING, imp. MESHED, pp. *mĕsht.* MESHY, a. *mĕsh'ĭ,* formed like net-work. MESH-WORK, net-work.

MESHID, *mĕsh'ĭd:* important city of Persia, capital of the province of Khorassan, in a fertile and well-cultivated plain, on the Tejend; lat. 36° 17′ n., long. 59° 40′ e. It is by far the most important town of northeastern Persia, being the centre of numerous converging routes. The city presents a surprising and beautiful view from a distance. Above the walls, which are of vast circuit, shine the gilded dome of one of the most splendid mosques of the east, the beautiful minarets of the tomb of Imaum Riza, a follower of Ali, and the summits of other sacred buildings. Meshid, as the chief seat of the great sect of the Shiites, is of nearly equal importance with Mecca, sacred city of the orthodox Mohammedans. The town has manufactures of woolen goods and of metal-wares, especially sword-blades, gold work, and articles of jewelry. It is visited annually by 80,000 to 100,000 pilgrims. Caravans arrive almost daily. In the neighborhood are the ruins of Thus, old capital of Khorassan, which contains the tomb of the celebrated poet Firdûsi. Pop. 70,000.

MESIAL, a. *mē'zhĭ-ăl* [Gr. *mesos*, middle]: in *anat.*, middle; dividing into two equal parts. MESIAL LINE, an imaginary plane dividing the head, neck, and trunk into similar halves toward right and left.

MESILLA, *mā-sēl'yâ:* valley and town on the Rio Grande, New Mex., acquired of Mexico by the United States 1834 by purchase, under the Gadsden treaty; lat. 32° 17′ n., long. 106° 45′ w. The valley is narrow, but fertile, on the s. overland route to California. The town was settled 1850. Pop. (1870) 1,578; (1900) 1,274.

MESLIN: see MASLIN.

MESMER, *mĕs'mĕr*, FRANZ (according to some, FRIEDRICH-ANTON): founder of the doctrine of Animal Magnetism, or Mesmerism (see HYPNOTISM): 1733 or 4–1815, Mar. 5; b. at a village near the Bodensee. He studied at Vienna, and there took the degree M.D. 1766. About 1772, he began, with Father Hell, to investigate the curative powers of the magnet, and was led to adopt the opinion, that there exists a power similar to magnetism, which exercises an extraordinary influence on the human body: this he called Animal Magnetism, and published an account of his discovery, and of its medicinal value, 1775. Honors were conferred on him in Germany. In 1778, he went to Paris, where he attracted much attention. His system obtained the support of members of the medical profession, as well as of others; but he refused an offer of an annual pension of 20,000 livres (about $4,000) to reveal his secret; and this, with other circumstances, gave rise to suspicion, and induced the government to appoint a commission of physicians and naturalists, whose report was unfavorable to him. He then fell into disrepute, and after a visit to England, retired to Meersburg, where he spent the rest of his life in complete obscurity.

MESMERISM, n. *mĕz'mĕr-ĭzm* [F. *mesmérisme*—from *Mesmer*, who first brought it into notice about 1776]: art of inducing a state of complete coma or insensibility, or of somnambulism, in which the operator claims to control the actions, and communicate directly with the mind, of the recipient; the doctrine of animal magnetism. M. is more properly termed HYPNOTISM (q.v.). MESMERIC, a. *mĕz-mĕr'ĭk*, or MESMER'ICAL, a. *-ĭ-kăl*, pertaining to mesmerism. MESMERIZE, v. *mĕz'mĕr-īz*, to influence by external agency so as to cause a state of complete insensibility, or a state of somnambulism. MES'MERIZING, imp. MES'MERIZED, pp. *-īzd:* ADJ. being in the mesmeric state. MES'MERIZA'TION, n. *-zā'shŭn*, the act of mesmerizing. MES'MERIZER, n. *-ī-zĕr*, one who practices mesmerism. MES'MERIST, n. *-ĭst*, one who practices mesmerism or believes in it.

MESNE, a. *mēn* [Norm. F. *mesne*, middle: L. *medĭŭs*, middle]: in *law*, middle, intervening—applied to a writ issued during the progress of an action. MESNE LORD, in *English law*, a lord who is himself a tenant to some other lord called a lord paramount. The phrase is not now

used, because subinfeudation was abolished in the time of Edward I. MESNE PROCESS, name given to writs which issued in respect of a pending action before final judgment was given. MESNE PROFITS are the profits or rents drawn by a person who is wrongfully in possession of real property, and who is afterward ejected, in which case the mesne profits are recoverable with the estate itself.

MESO-, *mĕs′ō* [Gr. *mesos*, the middle]: a common prefix in scientific compound terms, signifying 'intermediate'; that which holds a middle place between others.

MESOBLAST, n. *mĕs′ō-blăst* [Gr. *mesos*, middle; *blastos*, a bud, a germ]: an intermediate layer or layers of cells, derived from the two primitive blastodermic laminæ in all animals above the Cœlenterata.

MESOCÆCUM, n. *mĕs′ō-sē′kŭm* [Gr. *mesos*, middle; Eng. *cæcum*, a portion of the large intestines]: in *anat.*, a duplicate of the peritoneum at the posterior part of the cæcum.

MESOCARP, n. *mĕs′ō-kârp* [Gr. *mesos*, middle; *karpos*, fruit]: in *bot.*, the middle of the three layers in fruits.

MESOCEPHALON, n. *mĕs′ō-sĕf′ă-lŏn* [Gr. *mesos*, middle; *kephălē*, the head]: in *anat.*, the eminence of transverse fibres between the lobes of the cerebellum. MES′OCEPHAL′IC, a. *-sĕ-făl′ĭk*, of or pertaining to the mesocephalon.

MESOCHILIUM, n. *mĕs′ō-kĭl′ĭ-ŭm* [Gr. *mesos*, middle; *cheilos*, a lip]: in *bot.*, the middle portion of the labellum of orchids.

MESOCOLON, n. *mĕz′ō-kō′lŏn* [Gr. *mesos*, middle; Eng. *colon*, a part of the intestines]: in *anat.*, that part of the mesentery to which the colon is attached.

MESODERM, n. *mĕs′ō-dĕrm* [Gr. *mesos*, middle; *derma*, skin]: another name for MESOBLAST, which see.

MESOGASTRIC, a. *mĕs′ō-găs′trĭk* [Gr. *mesos*, middle; *gaster*, the belly]: that which attaches the stomach to the walls of the abdomen.

MESOHIPPUS, n. *mĕs-ō-hĭp′ŭs* [prefix *meso-*; Gr. *hippos*, a horse]: genus of fossil *Equidæ*, from the Lower Miocene of N. America.

MESOLABE, n. *mĕs′ō-lāb* [Gr. *mesos*, middle; *labē*, a grip, a hold, a handle]: instrument for the finding of two mean proportionals between two given lines; it was used in solving the problem of the duplicature of the cube.

MESOLE, n. *mĕs′ōl* [Gr. *mesos*, middle]: a mineral of a grayish-white or reddish color, occurring in implanted globules with a flat columnar or fibrous structure. MESOLITE, n. *mĕs′ō-līt* [Gr. *lithos*, a stone]: a mineral, a lime and soda mesotype, of a dead-white or grayish color, occurring in long, slender crystals, and massive.

MESOPHLŒUM, n. *mĕs′ō-flē′ŭm* [Gr. *mesos*, middle; *phloios*, bark]: in *bot.*, the middle layer of the bark.

MESOPHYLLUM, n. *mĕs′ō-fil′lŭm* [Gr. *mesos*, middle; *phullon*, a leaf]: in *bot.*, the whole inner portion or parenchyma of leaves, situated between the upper and under epidermis.

MESOPIC, a. *mĕs-ŏp′ĭk* [prefix *meso-*; Gr. *opsis*, the face, the visage]: term applied to individuals or races having the naso-malar index between 107·5 and 110, as is the case of the negroid races.

MESOPODIUM, n. *mĕs′ō-pŏd′ĭ-ŭm* [Gr. *mesos*, middle; *podēs*, feet]: the middle portion of the foot of mollusk.

MESOPOTAMIA, *mĕs-o-pō-tā′mĭ-a* [Gr. *mesos*, middle; *potamos*, river]: region between the Euphrates and the Tigris; but the name is generally applied to the n. part of this region, called by the Arabs Al-Jesira (the Island). The northernmost districts of M. are mountainous, being penetrated by the s. spurs of the mountains of Armenia; all the rest is a plain, rarely broken by rocky heights. This plain is dry steppe, green with vegetation only in the wet season; but wherever it is naturally watered, or artificially irrigated, it displays fertility. The inhabitants are chiefly Turks, Kurds, Turcomans, and Yesids, with Armenians in the n. and Syrians and Arabs in the plains. The chief occupation of the people is feeding of cattle; and of the civilization of ancient times, or even of that which prevailed in a later period (during the Ayubite rule), few or no traces remain. M. is a part of the Turkish empire, and is divided into several eyalets. For the history of this country, see ASSYRIA: BABYLONIA.

MESOSPERM, n. *mĕs′ō-spėrm* [Gr. *mesos*, middle; *sperma*, seed]: in *bot.*, the second membrane or middle coat of a seed.

MESOSTERNUM, n. *mĕs′ō-stėr′nŭm* [Gr. *mesos*, middle; *sternon*, the breast]: the lower half of the middle segment of the thorax in insects.

MESOTHERMS, n. plu. *mĕs′ō-thėrmz* [Gr. *mesos*, middle; *thermē*, heat]: plants requiring but a moderate degree of heat for their perfect development.

MESOTHORAX, n. *mĕz′ō-thō′răks* [Gr. *mesos*, middle; *thorax*, the breast]: a middle thorax or trunk; the middle part of the thorax in insects.

MESOTYPE, n. *mĕs′ō-tīp* [Gr. *mesos*, middle; *tupos*, form, type]: a mineral prismatic zeolite, a silicate of soda and alumina, occurring abundantly in trap-rocks—known also as *natrolite*.

MESOZOIC, a. *mĕs′ō-zō′ĭk* [Gr. *mesos*, middle; *zōē*, life]: in *geol.*, term designating the group of geological periods whose fossil remains differ equally from those of the Paleozoic (ancient-life) and Cainozoic (newer-life) epochs. It is synonymous with the more usual term Secondary, and includes the stratified rocks of the Triassic, Oolitic, and Cretaceous periods.

MES'PILUS: see MEDLAR.

MESPRISE, n. *mĕs-prīz'* [OF. *mespris;* F. *mépris*, contempt—from L. *minus*, less, and mid. L. *prctĭārĕ*, to prize]: in *OE.*, contempt; scorn; misadventure.

MESQUITE' TREE: see MEZQUITE.

MESQUITE GRASS, *mĕs-kēt'*, Sp. *mĕs-kē'tā:* kind of pasture-grass abundant in the s.w. states; of genus *Aristida.*

MESS, n. *mĕs* [OF. *més;* F. *mets*, a service of meat: It. *messa*, a mess of meat—from L. *missus*, sent, in the sense of served up or dished: comp. Gael. *meas*, fruit]: a dish of food; a quantity of food prepared for a certain number of persons; a mixed mass; in the *army* and *navy*, a number of persons who eat together; the food provided for them: V. to eat together at a common table; to supply with a mess. MESS'ING, imp. MESSED, pp. *mĕst.* MESS'-MATE, one eating at the same table.

MESS, n. *mĕs* [Ger. *meischen*, to stir the malt in hot water: Gael. *measg*, to mix: OE. *mesh*, a disagreeable mixture: comp. Gael. *musach*, filthy: It. *mescolare*, to mix together]: a mixture disagreeable to the sight or taste; untidiness; disorder; a situation of distress or difficulty. *Note.*—MESS is a corruption of MESH, another form of MASH, which see.

MESS: originally a dish or portion of food; but used in the army and navy in the sense of a number or association of officers or of men taking their meals together. In societies consisting entirely of men, and of one set of men continually thrown together, it is a very important social point that the M. should be well regulated. There are consequently stringent rules—both of the service and of mutual etiquette—for its government. One officer acts as caterer, receives subscriptions from the several members, charges the wine to those who drink it, etc.; a steward has charge of the more menial department, arranging for the cooking, purchase of viands, servants, rations, etc.

In the British army, it is considered necessary for discipline that these messes should be quite exclusive, though, in the armies of continental Europe, and especially the French, the case is different, the utmost familiarity being encouraged between all ranks when off duty. The social equality of officers and men, due to conscription and promotion from the ranks, accounts for this difference of system.

Common seamen and common soldiers, in the navy and army respectively, *mess* together in tables comprising a certain number, according to their rations or squads; but this has no reference to the technical meaning of messing as applied to officers, and is merely for economy of fuel and labor in cooking of rations. See RATIONS.

In the United States the government has furnished the army, through the quartermaster-general, the ordinary articles of provision, but it has long been customary

for sutlers to follow the army and sell various luxuries to the soldiers. The sutlers are subject to martial law and are under strict surveillance. If convicted of wrong they are severely punished. As prices have often been exorbitant and the system tends to cause extravagance on the part of the soldiers, a strong effort was made in 1888 to abolish the sutler's department and establish army canteens (see CANTEEN) for the various regiments and stations, which should be under the direct charge of government, and which should furnish places for social gatherings, and supply to the various messes refreshments at slight advance on actual cost. In 1889 this feature of messing was adopted and, except in cases in which the canteen has degenerated into a saloon, is strongly commended by officers and privates. Its good effects are apparent in the greatly improved quality of the materials furnished and the diminished cost to the purchasers.

In the navy it has long been a cause of complaint by the officers that great expense was involved in obtaining any but the most common articles of food, and especially that the cost of entertainment of visitors, of whatever rank or station, was a heavy and unjust tax on their incomes. In the navies of other countries, particularly in that of Great Britain, an allowance is made by the govt. to commanders of the larger ships to meet the expense of entertaining naval official visitors. The U. S. govt. makes no allowance of this kind, and the cost of entertaining visitors, either at home or in foreign waters, must be borne by the officers of the ships on which the receptions are given.

MESSAGE, n. *mĕs'sāj* [F. *message*—from mid. L. *missatĭcŭm;* OF. *messatge*, a message—from L. *missus*, sent]: any notice or communication, written or verbal, sent from one person to another; an errand; the formal official communication, as from a president to congress, a governor to a legislature, a sovereign to parliament, or from one legislative house to the other. MESSENGER, n. *mĕs'sĕn-jĕr*, the bearer of a message or errand; a harbinger; in a *ship*, a cable used in weighing the anchor. *Note.*—In MESSENGER the *n* is intrusive, and thus stands for *messager;* so *passenger* for *passager*, and *scavenger* for *scavager.*—SYN. of 'messenger': carrier; courier; forerunner; herald; precursor; intelligencer.

MESSALIANS, a. *mĕs-sā'lĭ-anz* [from the Syriac name, those who pray]: same as EUCHITES (q.v.).

MESSALINA, *mĕs-sa-lī'na*, VALERIA: d. A.D. 48; daughter of Marcus Valerius Messala Barbatus, and wife of the Roman emperor Claudius. She was infamous for lasciviousness, avarice, and various atrocities. Taking advantage of the weakness and stupidity of the emperor, she played the adulteress without restraint, and unrelentingly caused all to be put to death who stood in the way of her unhallowed gratifications. The best blood of Rome flowed at her pleasure. Among her vic-

tims were the daughters of Germanicus and Drusus, Justus Catonius, M. Vincius, Valerius Asiaticus, and her confederate Polybius. She went so far in vice as to offer her charms for sale like a common prostitute; and at last, during a temporary absence of the emperor, she publicly married one of her favorites, C. Silius, upon which Narcissus, one of the emperor's freedmen, represented to him that M. was aiming at his destruction, and received orders that she should be put to death. This sentence was executed by Enodus, a tribune of the guards, in the gardens of Lucullus. Her name has become a by-word for lust and crime.

MESSA'NA: see MESSINA.

MESSAPIA, *mĕs-sā'pĭ-a:* Greek name for the Roman Calabria, peninsula in s.e. Italy: see CALABRIA: BRUTTIUM.

MES'SENGERS, KING'S (QUEEN'S): officers employed by British secretaries of state to convey dispatches at home and abroad. In former days, their occupation consisted, to a considerable extent, in serving the secretaries' warrants for apprehension of persons accused of high treason and other grave offenses against the state; frequently they kept the prisoners whom they apprehended at their own houses. They are now employed principally in foreign service.

MESSENGERS-AT-ARMS, in Scotland: officers who execute the process and letters of the courts of session and justiciary. They number at present about 100, and are appointed by, and are under the control of, the Lyon King-at-Arms (q.v.).

MESSENIA, *mĕs-sē'nĭ-a:* district in the s.w. of the Peloponnesus, bounded e. by Laconia, n. by Arcadia and Elis, and s. and w. by the sea. It was composed chiefly of extensive plains, watered by the *Pamisus* and other streams. Those plains were famous for fertility, particularly for their wheat-harvests. At an early period, after the Doric conquest, M. rose to power and opulence. Its chief cities were Messene, Methone, and Pylos. It is noted chiefly for its two wars with Sparta, known as the Messenian Wars: the first (according to the common chronology) B.C. 743 to 724; the second B.C. 685 to 668. In both wars the Messenians were defeated, and, in consequence, a great part of them emigrated to Sicily, where they took possession of Zancle, which then received the name of Messana, the present Messina. After 300 years, Epaminondas invited their descendants back to Greece, and they joyfully responded to his invitation. —M. is the name of one of the *nomarchies* of the modern kingdom of Greece.

MESSERVE, NATHANIEL: soldier and ship-builder: b. Portsmouth, N. H.; died 1758, June. He was lieut.-col. of the regt., under Col. Moore, which in 1744–5 New Hampshire furnished to aid in the siege of Louisburg, on the coast of Nova Scotia, from which point expedi-

tions had been sent to prey upon the commercial and fishing interests of the colonies. M. was the trusted and valiant leader of the N. H. soldiers in the defense of Fort Edward and the attack on Crown Point. In 1758 he started with the second expedition against Louisburg, but before reaching the scene of operations was stricken with small-pox and died. His son, GEORGE, held various govt. offices in N. H. and Mass., refused to join the patriots in their struggle for independence, and in 1777 sailed for England.

MESSIAH, n. *mĕs-sī'ă* [Heb. *mashiach*, anointed—from *mashach*, to anoint]: Christ, the Anointed; the Savior. MESSI'AHSHIP, n. the office of the Messiah. MESSIANIC, a. *mĕs'sĭ-ăn'ĭk*, pertaining to the Messiah. MESSIAS, n. *mĕs-sī'ăs*, the Messiah.—*Messiah*, equivalent to the Greek *Christos*, the Anointed, designates, in the Old Testament, the mighty leader, deliverer, and Savior, the promised One from God—of whose coming the Hebrew nation was expectant through many ages. In the later Jewish history, when the nation was bowed under a foreign and heathen yoke, the Messiah was looked and longed for, not only to restore their country to the power and splendor of the days of David and Solomon, but even, by compelling the Gentiles to acknowledge the supremacy of the theocratic people, to raise it to the summit of universal dominion. The oldest biblical records in their Messianic indications refer rather to the high degree of prosperity which the chosen people were to expect *for themselves* under Messiah's reign. This expectation, already visible in the Abrahamidæ, appeared as for a moment to have realized itself in the conquest of Canaan; but the subsequent, often disastrous wars (in the period of the 'Judges' and of Saul), as well as the internal feuds and dissensions of the Hebrews themselves, left it in fact unfulfilled. Nevertheless, the hope of the appearance of the M. had rooted itself strongly in the people, and, during the glorious and peaceful reigns of David and Solomon, had so grown and enlarged, that even after the secession of Israel from Judah, and during the momentous ages that elapsed until the destruction of the Jewish kingdom, it was confidently expected that God would raise up a 'branch from the stem of David' as the M., the founder of the national prosperity, and the bringer-in of the all-embracing theocratic sovereignty. That branch was declared to be 'the anointed of the Lord,' and, since David applied that epithet to himself, the Jews transferred it to the deliverer whom they expected, and called him 'Son of David.' The prophetic writings contain many such allusions to the M., whose coming was expected shortly, and even during the time of the generation then living, whose birthplace, in congruity with his Davidic descent, was announced to be Bethlehem, and who, it was believed, was to be endowed with the attributes of God. These prophetic allusions are commonly termed MESSIANIC PROPHECIES. Together with such expectations the proph-

ets associated the idea of a forerunner (Elijah, Jeremiah, or Moses), whose function was to prepare the people for the appearance of the Messiah. The coming of the Messianic kingdom was to be preceded by a period of severe misfortune and bitter sorrows, the purpose of which was the reconciliation of the people with God (Is. i. 25, etc.; Joel iii.; Dan. ix.; Zech. xiii.). These sorrows are called the woes of the Messiah: they are minutely described in the second book of Esdras—an apocryphal work. Hence sprang up and became diffused among the Jews the idea of a suffering Messiah, who, by enduring grief and shame, should make atonement for the people, and reconcile them with God. This conception was greatly strengthened by the picture in the second Isaiah (lii. and liii.) of a 'servant of God,' which, in fact, is generally regarded as the most distinct prophecy of the Savior. Hence the step further of considering the Messiah an offering and sacrifice for the sins of the people, was an easy one; yet, on the other hand, the step seems not to have been taken by the nation at large, who were dazzled by the expected glory, so that their eyes failed to see their Messiah as the 'Man of Sorrows' so wondrously portrayed by Isaiah. It is singular that no trace of this part of the prophetic view is found in the Apocrypha. The popular belief of the Jews was that the Messiah was to live forever (Jn. xii. 34); therefore a crucified Savior was a stumbling-block to them (I Cor. i. 23), and even the disciples of the Lord Jesus did not comprehend his allusions to his death, and their faith in him as the Messiah was long dim and doubtful. In fact, this popular form of the Messianic belief of the Jews—accordant with their national pride as God's chosen people—was the very reason why they failed to recognize Jesus as the Messiah. In the later Judaism (as it shows itself in the Talmud), the conceptions of the Messiah are rich in singularities. It was believed that the *true* Messiah, the son of David, would be preceded by another Messiah, a son of the patriarch Joseph, or Ephraim, who should suffer death for men as a sin-offering. Century after century, the Jews have expected the glorious Messiah; and repeatedly have they risen and placed themselves under the standard of dreamers, fanatics, and impostors, who took to themselves the sacred name; e.g., Bar-Cochba (q.v.) in the 2d c.; one Moses in the Isle of Candia in the 5th c.; one Julian in Palestine in the 6th c.; several in Persia, and Arabia in the 12th c.; and, as late as the 18th c., Sabatai Zevi, in Aleppo. Even yet, the hope of a Messiah is not dead in the hearts of the strict Talmudistic Jews.

An important side light on the doctrine of the Messiah is afforded by a study of the theology of the Samaritans, who claim to hold the Messianic doctrine in its primitive form, uncolored by foreign influence on later Jewish history, and by the unconscious distortions of Christian

interpretation. Practically the entire prophetic basis of the Messianic hope as interpreted by their present high priest, Jacob ben Aaron, is Deut. xviii. 15-22. According to their belief, the Messiah is in no sense a Son of God, but a prophet raised up from among the people, and like unto his brethren, and to Moses. Whether he is to come of the priestly line is disputed, but it is expected that he will be a ruler. He is not to end the sacrifices, which are held to have their own significance; and the celebration of the Passover, which is still maintained, is expected to continue after the Messiah comes. There appears in their doctrine no apparent element of vicarious sacrifice. The Samaritan high priest set forth these views in articles in the *Open Court,* in 1907, May and Sep., but the Samaritan theory, while it may serve as a check upon too free an interpretation, is not to be regarded as certainly presenting the original form of the Jewish Messianic hope.

The *crucial* question of theology, however, is not the form in which the doctrine of the Messiah was held by the Jews. All rational students of Scripture, whether 'orthodox' or 'heterodox,' now admit that its growth was gradual, and that it acquired precision and definiteness of outline in the course of ages, from its first rude phase, among the pastoral princes of the Syrian wilderness, down to that sublime, yet shadowy personality—the Man of Sorrows—that continually recurs to the vision of the post-exitic Isaiah (xl.-lxv.). The grand question is: Was this doctrine essentially a divine inspiration, an objective truth of God, or only a lofty conception of the religious soul? The rationalistic theologians maintain —and endeavor to prove by analytic examination of the Gospels—that Jesus assumed the dignity of Messiah to accommodate himself to a rooted conception of his countrymen, and partly because he himself believed it—a conclusion, it is said, at which he might arrive quite honestly, since he felt that the spiritual *truth* which he brought to men was the real and only power of the 'kingdom of God,' and that therefore he was justified in applying to himself all that was said (tropically) by the prophetic poets in times of old concerning him who should usher in this 'golden age' of the world's faith. The great mass of orthodox theologians, on the other hand, accepting the New Testament as presenting in essentially accurate form the simple truth concerning the Lord Jesus, and regarding the so-called Messianic prophecies of the Old Testament as the revelation of a consistent and growing ideal whose inception and preservation may truly be called inspired, and which found no adequate fulfillment in any man's hope of the prophetic authors than that revealed 'in the fulness of time' in Jesus Christ, repudiate the principle of accommodation, or even spiritual application, and try to show that the Savior accepted the Messianic prophecies as literally and

exclusively applicable to him. The historico-spiritual school, represented in Germany by men like Neander, Rothe, Tholuck, etc.—and in England and America, generally speaking, by the divines of the 'Broad Church' party—occupy a middle position, yet not so strictly a compromise between, as a combination of, these two extremes: with the rationalists, they hold that the Old Testament doctrine of the Messiah was gradually developed, contains many human elements, and might not necessarily have implied a knowledge of the historical Jesus on the part of those who announce it; with the 'orthodox,' on the other hand, they assert that the doctrine is the expression of a fact, not of a sentiment—that Jesus of Nazareth was actually the Son of God, the appointed Messiah, and that in him the so-called Messianic prophecies were fulfilled in a far higher sense than ever the prophets could have dreamed. It will thus be seen that the rationalists interpret the doctrine of the Messiah as essentially a subjective religious idea; while the orthodox and the historico-spiritual school hold that the doctrine was the expression of a divine fact—the substance of a heavenly faith.

Increasingly, however, the tendency grows of interpreting the Messianic mission of Jesus in terms of world-relationships. What Jesus did which belonged to a single age is held to be subordinate in importance to that which he continues to do. The view of the opening verses of the Acts of the Apostles that the earthly ministry of Jesus reveals only that 'which Jesus began both to do and to preach,' and of the Apostle Paul, that the real and essential knowledge of Jesus is that of his power to reproduce the Christlike character in men of every generation, leads to a shifting of emphasis from Jesus as the Messiah of the Jews to Jesus as the Savior of the world. The local, the national, the incidental, however true and in their time important, grow relatively less before the essential, the permanent and the universal. Under the influence of convictions such as these, the Christian conception of the Messiah grows broader than that from which the idea was derived; and he who was born King of the Jews is considered as the desire of all nations.

MESSIEURS, n. plu. *mĕs'yėrz* [F. plu. of *monsieur*]: sirs; gentlemen; contracted MESSRS. *mĕs'ėrz*, which is used as the plu. of Mr.; put before the designations of firms or commercial houses that conduct their business under more than one name, when speaking of them or addressing them by letter, as *Messrs.* Wm. Blackwood & Sons, *Messrs.* T. B. Campbell & Co. See MASTER.

MESSINA, *mĕs-sē'nâ:* province in n.e. Sicily, separated from the mainland of Italy by the Strait of Messina—a separation attributed to an earthquake before the historic period. The province includes the Lipari Islands; its Sicilian coast is on the Ionian Sea; and Mt. Etna marks

its s.w. boundary. Area 1,768 sq.m. Pop. (1901) 543,809. See SICILY.

MESSI'NA: city of Sicily, chief town of the province of Messina; one of the most ancient and most important cities of the island; charmingly situated on the Strait of Messina, encircled by a zone of abrupt conical rocks, commanding a view of Calabria. The town is inclosed by old walls, and has several fine squares and wide lava-paved streets. The harbor, formed by a projecting tongue of land curved in the form of a sickle (whence its primitive name, Zancle—Gr. sickle: see MESSENIA), is about 4 m. in circumference, and can contain a thousand ships; it is defended by a citadel and six forts; the depth is sufficient to admit vessels of large size; and the quays are spacious. The trade of Messina, chiefly in silk, oil, wine, coral, fruits, linseed, fish, etc., though less extensive than formerly, is still an important source of wealth to Sicily. The chief imports are cotton and woolen manufactures, hardwares, and other colonial products. The damasks and satins of Messina are excellent, and the fisheries important. Messina has steamboat communication with Naples, Marseille, and Malta. In the 15th c., Messina was a renowned seat of learning; and in the 16th c. a famous school of painting was founded there by Pelidoro da Caravaggio. In modern times, it has undergone terrible vicissitudes, having been ruthlessly bombarded by the royal forces on several occasions during the war of independence 1848. Pop. (1901) 149,778.

MESSI'NA, STRAIT OF [It. *Faro di Messina;* Lat. *Mamertinum fretum*]: between Italy and Sicily, 22 m. in length, and 2½ to 10 m. wide. A strong current runs through the strait, which is of great depth. See SCYLLA AND CHARYBDIS.

MESSMER, SEBASTIAN GEBHARD, D.D., D.C.L.: American Roman Catholic prelate: b. Goldach, Switzerland, 1847, Aug. 29. He attended the high school at Rorschach and later the College of Saint George near Saint Gall, afterward entering the University at Innsbruck, Austria. Ordained a priest 1871, July 23, he landed in New York the following October and was appointed professor of theology in Seton Hall College, retaining the position until 1889, in which year he became professor of canon law at the Catholic University, Washington, D. C. On Dec. 14, 1891, he was preconized bishop of Green Bay, Wis., being consecrated 1892, Mar. 27, and assuming charge of his diocese 1892, Apr. 7. He was elevated to the archbishopric of Milwaukee, Wis., 1903, Dec. 10, and on Feb. 10, 1904, took possession of his new see. Archbishop Messmer has been actively interested in the Western Summer School, and recently has devoted much time to the study of socialism, upon which subject he has delivered public lectures. He is the author of *Praxis Synodalis* (1883), and *Spinago's Method* (1901), etc. In 1904,

Nov., Pope Pius X. sent the pallium to Archbishop Messmer.

MESSUAGE, n. *mĕs'swāj* [OF. *mesuage*—from mid. L. *mesuāgĭŭm*, a manor-house—from L. *mansus*, a residence—from *manĕō*, I remain, I abide]: in *law*, a dwelling-house and offices, with the land attached; a tenement.

MESTEE, n. *mĕs'tē*, or MUSTEE, n. *mŭs'tē* [Sp. *mestizo*, mongrel: see next entry]: in the *W. I.*, a person of mixed breed; offspring of a white and a quadroon.

MESTIZO, n. *mĕs-tē'zō*, also MESTINO [Sp. *mestizo;* OF. *mestis*, of a mixed race—from L. *mixtus*, mixed]: in Mexico, Central and S. America, the offspring of a Spaniard, or a creole, and a native Indian. The female form is MESTIZA. The offspring of an Indian father and a mestiza is called *mestizo-claro;* of a mulatto and mestiza, a *chino;* of a negro and mestiza, a *mulatto-oscuro.*

MESTRE, *mĕs'trā:* town of n. Italy, province of Venice, 5 m. n.w. of the city of Venice, on the margin of a lagoon. There are many villas around the town, which has a considerable transit-trade. Pop. 4,500.

MET, pt. and pp. of MEET. See MEET 2.

META, *mĕt'ă* [Gr.]: a prefix in words of Greek origin, meaning beyond; after; over; a change or transference.

META, *mā'tâ:* a river of South America, which has its rise on the eastern slope of the Andes Mountains near Bogota in Colombia. It is formed by the junction of two small mountain streams, which unite about 40 miles southeast of Bogota; then flows east-northeast into the Orinoco; a course of about 500 miles.

METABASIS, n. *mĕ-tăb'ă-sĭs* [Gr. *metabăsis*, a transition—from *meta*, beyond; *baino*, I go]: in *rhet.*, a passing from one thing to another; transition.

METABOLA, n. *mē-tăb'ō-la* [Gr. *metabolē*, change—from *meta*, beyond; *bole*, a casting]: a change of some sort, as of air, time, or disease.

METABOLIC, a. *mĕt'ă-bŏl'ĭk* [Gr. *metăbŏlē*, change—from *meta*, beyond; *ballō*, I throw]: pertaining to change or affinity; applied to chemical changes occurring in living bodies. METABOLISM, n. *mĕ-tăb'o-lĭzm*, the process of change which food-stuffs undergo in the body. METABOLIC FORCE, vital affinity.

METABOLISM: this term is used to express the sum of the chemical changes occurring in the animal body and includes anabolism, or assimilation, and katabolism, or disintegration. In perfect equilibrium these two processes exactly balance each other, the amount taken in and utilized by the economy equalling the amount of waste thrown off. When the latter is in excess the body emaciates; when the intake exceeds the output weight increases. In youth the anabolic processes predominate, in old age the katabolic, while in the healthy adult there is metabolic equilibrium. Anabolism is the continuatic

of digestion, the appropriation by the tissues and organs of the nutritive materials prepared for assimilation in the digestive tract. Katabolism is the beginning of excretion, the casting out from the tissues and organs of the used-up and now poisonous materials—the ashes of the animal machine. The disorders of metabolism are those diseases in which the nutritive processes are manifestly at fault; such are gout, diabetes mellitus, and obesity (q.v.).

METABOLISM, n. *mĕ-tăb'o-lĭzm* [Ger. *metabolismus*]: in *theol.*, a term coined by Rückert to describe the doctrinal views of Ignatius, Justin, and Irenæus on the Lord's Supper. They stand midway between transubstantiation and the merely symbolical view, and hold fast to an objective union of the sensible with the supersensible.

METACARPAL, a. *mĕt'ă-kâr'păl* [Gr. *meta,* beyond; *karpos,* the wrist]: pertaining to the part of the hand between the wrist and the fingers. MET'ACARPUS, n. *-kâr'pŭs,* the long bones of the palm of the hand.

METACENTRE, n. *mĕt'ă-sĕn'tĕr* [Gr. *meta,* beyond; *kentron,* the centre]: a certain point in a floating body, on the position of which the stability of the body depends. See HYDROSTATICS.

METACETONE, n. *mĕ-tăs'ĕ-tōn* [Gr. *meta,* change, and Eng. *acetone*]: a colorless liquid of a pleasant odor, obtained by distilling a mixture of sugar or starch and quicklime.

METACHRONISM, n. *mĕ-tăk'rŏn-ĭzm* [Gr. *meta,* beyond; *chronos,* time]: an error in chronology by placing an event after its real time.

METACHRO'SIS: the change of color brought about in the surface of certain animals, either voluntarily or involuntarily, to make them conform to their surroundings. It is exhibited in many of the lower animals as a protective device, especially in cuttlefishes, caterpillars, various amphibians, especially frogs, and certain lizards, notably the chameleons. The dark pigment to which the brown or gray colors of metachroic caterpillars are due is deposited in the cells of the outer skin, while the green coloring matter is found in the underlying fat; and, as Carpenter says, experiments have shown that the presence or absence of both kinds of pigment is determined by the surrounding objects through the quality of the light reflected from them, the suppression of the superficial dark pigment allowing the deeper green to show through the skin, and thus give its hue to the caterpillar. It has been shown that the formation of the dark pigment is hindered by the action of certain yellow rays which are absorbed by dark objects, but reflected from green leaves and shoots.

The process of change in squids, frogs, etc., through nervous and muscular control of pigment sacs, called

chromatophores, is somewhat different, and is explained in the article CHAMELEON. The power possessed by these animals of adapting their color to their surroundings must be of great value in ensuring preservation from enemies. Consult: Beddard, *Animal Coloration* (1892).

METAGE, n. *mē'tāj* [from METE, which see]: measurement of coal; the price of measuring.

METAGENESIS, n. *mĕt'ă-jĕn'ĕ-sĭs* [Gr. *meta*, beyond; *genĕsis*, a beginning]: the changes of form which the representative of a species undergoes in passing, by a series of successively generated individuals, from the egg to the perfect or imago state; the succession of individuals which present the same form only at every alternate generation; alternate generation. METAGENETIC, a. *mĕt'ă-jĕ-nĕt'ĭk*, pertaining to metagenesis; referring to the production of changes in a species after its first origin, as it goes on to a more perfect state.

METAGRAMMATISM, n. *mĕt'ă-grăm'mă-tĭzm* [Gr. *meta*, beyond; *gramma*, a letter]: the change or transposition of the letters of a name into such a position as to express sense in relation to the person named; also called *anagrammatism*.

METAGRAPHY, a. *mē'tăg'ră-fĭ* [Gr. *meta*, beyond, change; *grapho*, I write]: the art or act of rendering the letters of the alphabet of one language into the possible equivalents of another, so as to express the words of the one by the letters of the other as nearly as possible, as, expressing Hebrew characters by English letters; transliteration. METAGRAPHIC, a. *mĕt'ă-grăf'ĭk*, of or pertaining to.

METAKINESIS. See KINESIS.

METAL, n. *mĕt'ăl* [F. *métal*, a metal—from L. *metal'lum;* Gr. *metal'lon*, a mine whence metals are dug, a metal—*lit.*, any hard stuff or material out of a mine]: a body, such as gold, silver, copper, iron, etc., distinguished by its lustre, its opacity, its conductivity of heat and electricity, its fusibility, etc. (see METALLURGY; METALS—NON-METALS); broken stones used for roads; broken glass for the melting-pot. In *her.*, the 'metals' in use are gold and silver, known as or and argent. The field of the escutcheon and the charges which it bears may be of metal as well as of color: and it is a rule of blazon that metal should not be placed on metal, nor color on color: V. to cover, as a road, with broken stones; to make up or mend a road with broken stones. METALLING, imp.: N. *mĕt'ăl-ĭng*, the act of forming the surface of a road with broken stones. METALLED, a. *mĕt'ăld*, covered or laid over with broken stones, as a public road. METALLIC, a. *mĕ-tăl'ĭk*, pertaining to metals; like a metal; consisting of metal. MET'ALLIZE, v. *-īz*, to render metallic; to cover or impregnate with metal. MET'ALLIZING, imp. MET'ALLIZED, pp. *-īzd*. METALLIZATION, n. *mĕt'ăl-ī-zā'shŭn*, the process of forming into a metal.

METALLIST, n. *mĕt'ăl-ĭst,* a worker in metal. METALS, n. plu. the rails on the permanent way of a railway. MET'ALINE, n. *-ĭn,* metallic compound used instead of oil or grease as a lubricant for machinery; invented 1870. METAL-REFINER, a smelter of ores; one who separates copper, lead, or other metal, from the dross or refuse with which it is mixed. THE PERFECT or NOBLE METALS, those which are not easily oxidized, as platinum, gold, and silver. THE BASE or IMPERFECT METALS, those which readily combine with oxygen, as iron, lead, copper, tin, and zinc. MUNTZ METAL, *mŭnts* [after the inventor]: an alloy made into sheets, used for sheathing ships and for other purposes, consisting of 50 per cent. of copper, 41 of zinc, and 4 of lead; also said to be 60 parts of copper and 40 of zinc. METALLIC CURRENCY, the coins forming the circulating medium of a country. WHITE METAL, German or nickel silver.

METAL. See METTLE.

METALEPSIS, n. *mĕt'ă-lĕp'sĭs* [Gr. *meta,* beyond; *lepsis,* a receiving or taking]: in *rhet.,* the union of two or more figures of speech of different kinds in the same word. MET'ALEP'TIC, a. *-lĕp'tĭk,* or MET'ALEP'TICAL, a. *-tĭ-kăl,* pertaining to a metalepsis; transverse; transposed. MET'ALEP'TICALLY, ad. *-kăl-ĭ.*

METALLIFEROUS, a. *mĕt'ăl-ĭf'ėr-ŭs* [L. *metallum,* a metal; *fero,* I produce]: producing or yielding metals, as strata or districts.

METALLIFORM, a. *mĕ-tăl'ĭ-fawrm* [L. *metallum,* a metal; *forma,* shape]: in the form of metals; like metal.

METALLINE, a. *mĕt'ăl-ĭn* [L. *metallum,* metal (see METAL)]: consisting of metal; impregnated with metal.

METALLOCHROMES, n. plu. *mĕ-tăl'lō-krōmz* [Gr. *metallon,* a mine whence metals are dug; *chroma,* color]: the beautiful prismatic tints produced by depositing a film of peroxide of lead on polished steel by electrolytic action.

METALLOGRAPHY, n. *mĕt'ăl-ŏg'ră-fĭ* [Gr. *metallon,* a mine; *grapho,* I write]: a treatise on metals or metallic substances.

METALLOID, n. *mĕt'ăl-oyd* [Gr. *metallon,* a mine; *eidos,* a form]: a term formerly applied to the non-metallic inflammable bodies, as sulphur, phosphorus, etc.; also applied to all the non-metallic elements (see METALS—NON-METALS). MET'ALLOID, a., or MET'ALLOID'AL, a. *-oyd'ăl,* having the form or appearance of a metal.

METALLURGY, n. *mĕt'ăl-ėr'jĭ* [OF. *metallurgie,* a search for metal—from Gr. *metallourgos,* mining, working in metals—from *metallon,* a mine, a metal; *ergon,* work]: the art of obtaining metals from their ores; the art of working metals. MET'ALLUR'GIC, a. *-ėr'jĭk,* pertaining to the art of working metals. MET'ALLUR'GIST, n. *-jĭst,* one whose occupation is to work in metals.

MET'ALLURGY: art of extracting metals from their ores. The operations are partly mechanical and partly chemical. Those processes which depend principally on chemical reactions for their results have reference chiefly to the roasting and smelting of ores: see titles of the different metals. But there are certain preliminary operations of a mechanical kind which metallic ores undergo, such as crushing, jigging, washing, etc., which are here described, as they are essentially the same for the ores of lead, copper, tin, and zinc, and indeed most of the metals. (For IRON, see that title.)

Ores are first broken with hammers into pieces of convenient size for crushing or stamping. Waste materials, such as pieces of rock, spar, etc., which always accompany ore, are as far as possible picked out by hand, and the ore itself is arranged in sorts according to its purity. Various kinds of apparatus, such as riddles, sieves, etc., are then used for separating it into different sizes, to secure a uniform strain on the crushing machinery.

Figs. 1 and 2 represent one of the most approved forms of a crushing-mill. The ore is raised in small wagons, *a*, to the platform *b*, where it is ready to be supplied to the crushing-rollers *r* through the opening *c*. These rollers are mounted in a strong iron frame, held together by wrought-iron bars, and bolted to strong beams. Their distance apart is regulated by the lever *d*, to which a weight *e* is attached. The bearings of the rollers slide in grooves, so that, when any extra pressure is put upon them by a large or hard piece of ore, the

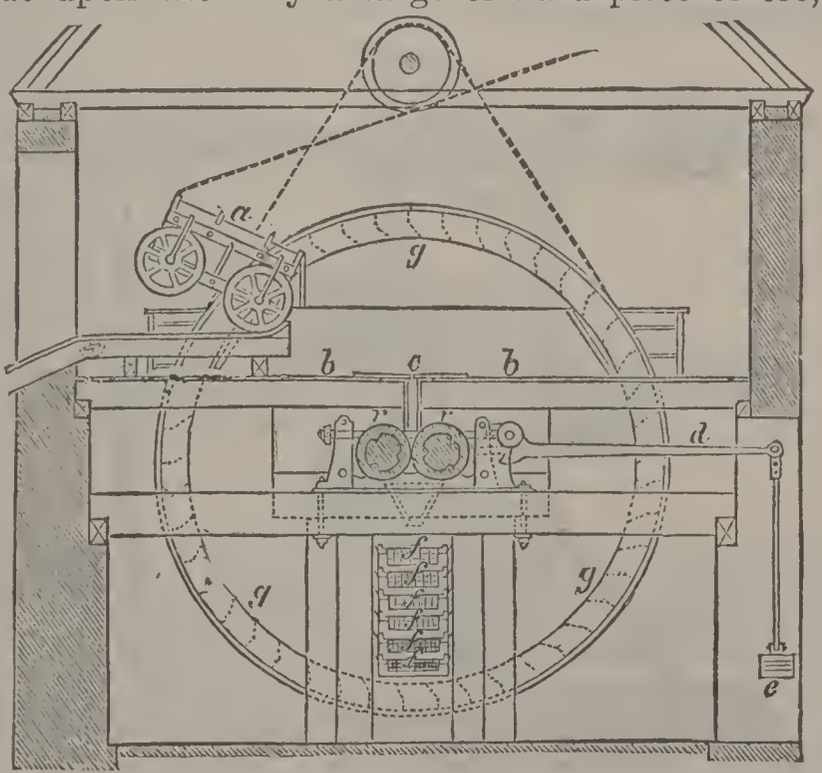


Fig. 1.—Ore Mill:
End view of the crushing-rollers, sieves, and bucket-wheel.

lever rises, and allows the space between the rollers to widen. The crushed ore falls upon a series of sieves, *f*, which are made to vibrate. These have meshes increas-

ing in fineness as they descend; and the upper two are so wide that pieces of ore too large to pass through them

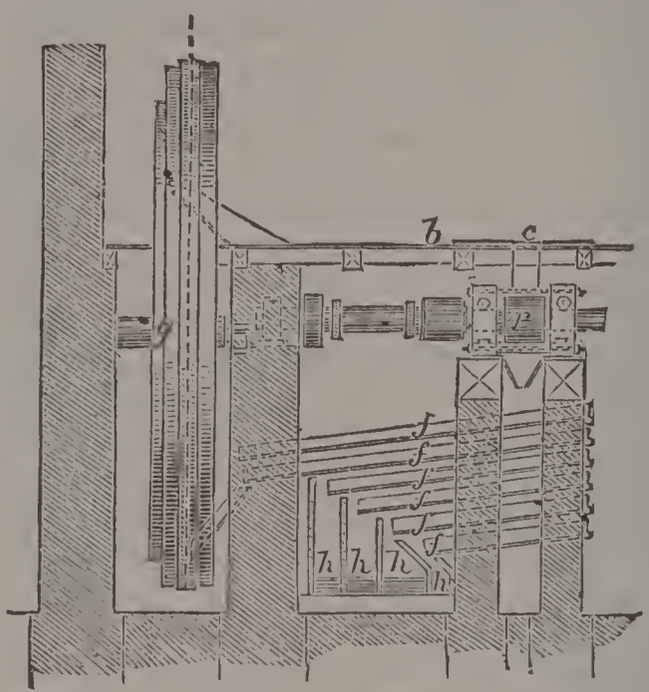


Fig. 2.—Ore Mill:
Side view of the crushing-rollers, sieves, and bucket-wheel.

are conducted into the lower part of the bucket-wheel *g*, and raised again to the platform, to be recrushed. The lower four sieves separate the remaining portion of the crushed ore into different degrees of fineness, and it is collected in the pits *h*.

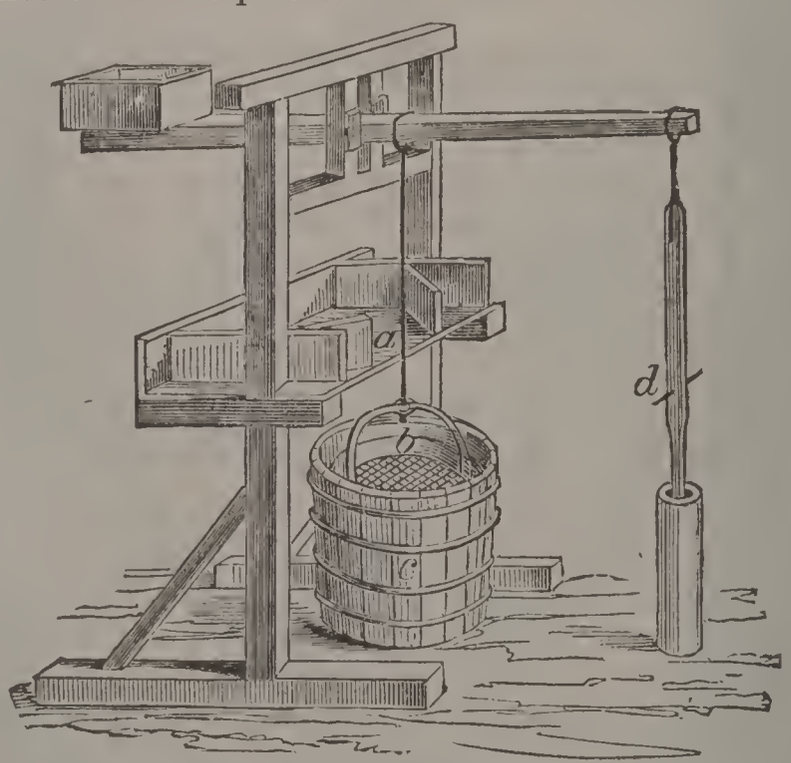


Fig. 3.—Jigging-sieve.

Instead of crushing-rollers, sometimes a stamping-mill is used, especially for tin ores, which require to be reduced to fine powder. The stamping-mill consists of a series of upright shafts with a weighty piece of iron at

the bottom of each. They are raised by means of an axle with projecting cams, and then, falling by their own weight, act like hammers.

After being crushed the ore is washed and sifted on a jigging-sieve. One of the simplest forms is shown in fig. 3. The ore is placed on the table *a*, from which the sieve *b* is filled. It is then immersed in a tub of water *c*, and a jigging motion communicated to it by a workman alternately raising and lowering the handle *d*. This effects two purposes—it washes the ore, and it separates the material into two layers: the upper consists of the lighter spar and other impurities, which are raked off; and the lower consists of the heavier and purer portions of the ore, which are now ready for the roasting furnace.

It will be apparent that in the bottom of the tub there must be a quantity of more or less valuable ore, which, from its fineness, has fallen through the sieve. This is called sludge or slime; and the minute particles of ore that it contains are recovered either by simply forming an incline on the ground, and washing it with a current of water, or by using an inclined table, such as is shown in fig. 4, called a *sleeping-table*. Ore which has been reduced to powder at the stamping-mill, as well as slime, is washed by this apparatus. The material is put into the chest *a*, which is placed in a sloping position, and is supplied with water on turning the stop-cock *b*. The current carries the contents of the chest through the opening at the bottom, and spreads it, with the aid of

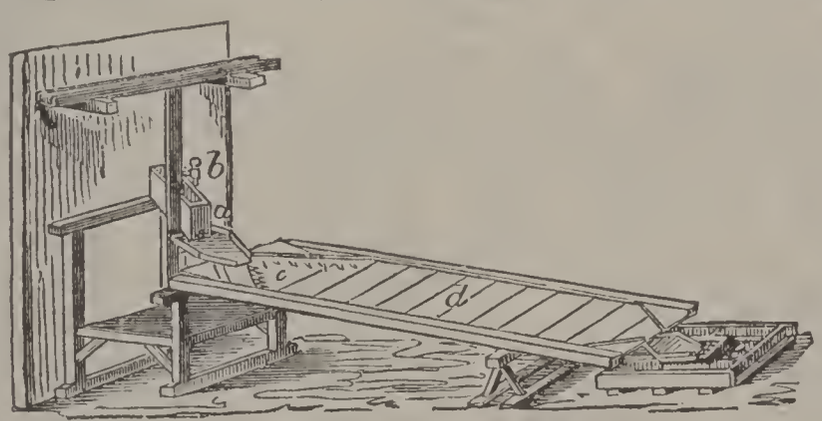


Fig. 4.—Sleeping-table.

a series of stops, or small bits of wood, *c*, over the surface of the table *d*. A stream of water is then kept flowing over the table till all the earthy impurities are carried down into the trough *e*, the pure particles of the ore remaining, by reason of their greater specific gravity, near the top of the table, whence they are removed to be smelted. Sometimes the table is suspended by chains, and receives a succession of blows at the top from a *buffer*, moved by cams on the same principle as the stamping-mill. This arrangement is found of great advantage in dressing very poor ores.

The variety of machinery and apparatus used in dressing ores is very great, and they pass under different names, but they all are very similar in principle.

MET'ALS—NON-METALS: in chemistry, the two great divisions of the elements (see ELEMENT). (For each metal, see its title.) In general, those elements whose oxides give rise to *bases* (q.v.) are called metals, whereas those oxides which produce acids are derived from non-metals. This division is very convenient and corresponds rather closely with differences in the physical properties of the elements in question, but the classification into metals and non-metals is, in many cases, purely arbitrary. It is retained for its practical convenience. Usually metals are distinguished by their peculiar characteristic lustre. This is not exhibited by certain metals when they are in a very finely divided state, but it comes out when the powder is rubbed by a burnisher. A few non-metals also have a lustre. The metals are, as a rule, good conductors of heat and electricity. Silver shows this property to the most marked extent, whereas antimony is almost at the foot of the list. The melting point of the metals is relatively high. Mercury melts at —40° C. and potassium at 62.5° C., whereas platinum and iridium require the high temperature of the oxyhydrogen blowpipe or the electric furnace for their fusion. In density the metals exceed the non-metals. Osmium, the heaviest substance known, has sp. gr. 22.48, whereas that of lithium is only 0.59. The metals show the greatest diversity as regards their hardness, tenacity, etc., but, in general, they excel the non-metals in these attributes. The atomic weights of the metals are usually greater than those of the non-metals. An inspection of Mendeljeff's table of the Periodic System (see CHEMISTRY) will show that, whereas all the elements in groups 1, 2, 3 and 8 are metals, in the remaining groups the metallic characters do not become predominant until the atomic weight is relatively high. Many of the metals have the power of forming *alloys* (q.v.) with other metals. In some cases these are doubtless simple mixtures of the metals in question, but in many instances these alloys have properties so greatly different from those of the constituent metals that they must be regarded as compounds of the metals in question. The more important alloys are described in the articles dealing with the respective elements. The *salts* of the metals are described under the separate headings belonging to them. See also CHEMISTRY.

METAMERIC, a. *mĕt'ă-mĕr'ĭk* [Gr. *meta*, change; *meros*, a part]: in *chem.*, having different characters and properties, but the same ultimate elements and molecular weight with another body.

MET'AMERISM: when two or more chemical compounds have the same empirical formula, but consist of different radicals united by an element (or a radical) that is common to them all, the compounds are said to be 'metameric,' and the property itself is called 'metamerism.' The common element that unites the radicals is

usually oxygen or nitrogen. Good examples of metamerism are afforded by the compound ethers and amines. Dipropyl ether, methyl-amyl ether, and ethyl-butyl ether, for example, all have the empirical formula $C_6H_{14}O$; but dipropyl ether contains two propyl radicals (C_3H_7), methyl-amyl ether contains one radical of methyl (CH_3), and one of amyl (C_5H_{11}), and ethyl-butyl ether contains one radical of ethyl (C_2H_5) and one of butyl (C_4H_9); the two radicals being connected, in each case, by an oxygen atom. The structural formulæ of these respective compounds are therefore as follows:

Dipropyl ether. $\begin{matrix} C_3H_7 \\ C_3H_7 \end{matrix} > O$

Methyl-amyl ether. $\begin{matrix} CH_3 \\ C_5H_{11} \end{matrix} > O$

Ethyl-butyl ether. $\begin{matrix} C_2H_5 \\ C_4H_9 \end{matrix} > O$

The following amines, which all have the empirical formula C_3H_9N, illustrate metamerism in which nitrogen is the connecting element:

Propylamine. $N\left\{\begin{matrix} C_3H_7 \\ H \\ H \end{matrix}\right.$

Methylethylamine. $N\left\{\begin{matrix} CH_3 \\ C_2H_5 \\ H \end{matrix}\right.$

Trimethylamine. $N\left\{\begin{matrix} CH_3 \\ CH_3 \\ CH_3 \end{matrix}\right.$

Metamerism may be regarded as a species of accidental isomerism. When metameric compounds are treated with reagents which destroy the bonds between the constituent radicals and the atoms (of oxygen or nitrogen) by which they are united, the several members of the metameric group that is so treated yield totally different products, because they contain totally different radicals.

METAMORPHIC ROCKS: all rocks, whatever their origin, are subject to change after they are once formed. The term metamorphism is used to include all changes in the nature of rocks that have taken place within the crust of the earth. The rocks thus changed are called metamorphic rocks. Metamorphism may change a rock but slightly, or it may wholly alter the original texture of the rock and its mineralogical composition as well. The forces of metamorphism are dynamic action of some kind, chiefly in the form of pressure, heat and chemical action. The chief agent in making these forces effective is water.

The nature and effect of these forces may be briefly stated as follows: Within the crust, pressure may be due simply to the weight of overlying rocks, or in the upper crust much more intense pressure may result from lateral thrusts, due to the shrinkage of the earth. These thrust movements, which are ordinarily approximately parallel to the surface of the earth, are frequently so great that they cause the crust to buckle up in a series of folds, or it may induce cleavage planes to form at right angles to the pressure, and the rocks may adjust themselves to the pressure by slipping movements along these cleavage planes; often lubricating minerals, such as mica, are

formed on the planes to facilitate the movements. Pressure, also, may cause 'rock flowage,' that is, the constituents of the rock may be rearranged under the tremendous dynamic force applied to them in such a way that they are formed in more or less irregular foliated bands, arranged roughly at right angles to the pressure, each band frequently containing a large percentage of some one given mineral. (Rock flowage, it should be understood, is not flowage in the sense in which the term is applied to liquids, for rock flowage may take place while the rock is solid, but as Van Hise and others have pointed out, it consists in a continual breaking down and reformation of crystals that goes on continually, the process being greatly aided by hot water and pressure.)

This arrangement into a banded structure is termed foliation, or perhaps better, schistosity, and it is a characteristic feature of many metamorphic rocks. The bands are not in horizontal layers, such as characterize sedimentary rocks, but are generally crumpled or folded.

If a sedimentary rock, exhibiting bedding planes should be intensely metamorphosed, the resulting cleavage and schistose structures would not agree with the bedding planes as a rule, but would be formed at an angle to them. The sedimentary structure is apt to be wholly obliterated in extreme metamorphism, and only the secondary metamorphic features remain. The metamorphism due to pressure is termed dynamic metamorphism, and stands in contrast to that produced by chemical means. Dynamic metamorphism is an important assistant to other forms of metamorphism because it tends to crush the rock and to make it more accessible to other agencies. If pressure is relatively slight, the only metamorphism that results may be a slight consolidation of the rock, such as often results from the pressure of superjacent rocks.

Heat is another important agent in metamorphism. The solvent action of water is increased by heat, for instance. Within the crust, heat may be so great that it overcomes the pressure that is present and liquefies the rocks. The molten rock flows here and there, wherever pressure drives it, and wherever the path of least resistance permits it to go. The molten rock bakes the rock, drives off the water contained in it, and originates chemical changes of importance, and may fuse rocks to such an extent that recrystallization takes place. Chemical action, as a metamorphosing force, expresses itself chiefly in the form of solution or deposition from solution. There is a constant interchange of material going on in the deeper seated rocks. The material taken up in one place may be redeposited in another, filling the pores and fissures of the rock, and making it much more compact than formerly. This process of deposition is termed cementation and is an extremely important process, especially in the upper part of the crust, where sandstones,

for instance, may be altered into quartzites by this process.

Water, as an agent in metamorphism, is indispensable. There would be comparatively little metamorphism without it. Water occurs universally in rocks below the level of ground water; it is under any circumstance an important solvent, but when it contains organic acids, carbon dioxide and other chemical substances, its powers of solution are greatly increased. The solvent power of water is also enlarged many fold when it is highly heated or when it exists under great pressure. In the upper zone of rocks, the work of water is largely in the line of solution and redeposition of the solution under some changed circumstance. In the lower zone of rocks where heat and pressure are great, water not only becomes a great solvent but it performs important interchange of material, causing new minerals to be formed by fresh combinations and new crystals to take the place of the old. Water accomplishes this great work chiefly by its power of ionization, that is, its power to disassociate chemical compounds into simpler elements, which are thereby free to make new combinations, and therefore to produce new minerals by reason of the newer combinations. The changes taking place in the lower zone of rocks by reason of ionization is not unlike that caused by electrolysis, in which the electric current resolves a fluid compound into its proximate constituents or 'electrolytes.'

Through the various activities mentioned, rocks are altered or metamorphosed. The metamorphism may be on a large scale, covering even thousands of square miles, where deep-seated rocks, which are thoroughly metamorphosed, have been uncovered by erosion of overlying members: this type of metamorphism is termed regional. In other cases, the metamorphism may be on a small scale, as when a dike of igneous rock is injected into a limestone, for instance, and bakes it in the vicinity of the dike; this type is termed local or contact metamorphism.

According to the structure of the rock, metamorphic rocks may be classified into the stratified metamorphics, and the schistose or foliated metamorphics. In the first group, metamorphism has not wholly obliterated the original characters of the rocks; in the second group the original texture and character has disappeared.

In the case of bedded rocks of the first group, sandstones are usually metamorphosed into quartzites, shales into slates, limestone into marble, bituminous coal into anthracite, or graphite. In the second group are included the foliated or schistose rocks, chiefly the gneisses and schists. The gneisses usually exhibit a banded or foliated structure, and they contain several minerals as a rule. They are closely related to the granites in mineralogical composition and resemble them superficially, but differ

from them in origin and structure. The schists (q.v.) usually have undergone more metamorphism than the gneisses, and they differ from gneiss (q.v.) also in the absence of feldspar (q.v.), that mineral being altered as a rule into sericite or some other form of mica (q.v.). Many of our most beautiful and precious rocks owe their attractiveness in mineralogical and crystalographic characters to the process of metamorphism; this is exemplified in a striking way by the large and varied group of metamorphic rocks classed under the head of marble (q.v.).

METAMORPHOPSIA [Gr. *metamorphopsis,* change, and *ops,* eye]: a term applied to a disease in which a piece of the retina while retaining its vitality is displaced from its proper position. In this case objects which are seen by means of it are seen as they would have appeared from the original position belonging to the displaced retinal element.

METAMORPHOSIS, n. *mĕt'ă-mŏr'fŏ-sĭs,* MET'AMOR'PHOSES, n. plu. *-fŏ-sēz* [L. *metamorphōsĭs,* a transformation—from Gr. *meta,* beyond, over; *morphē,* form, shape: F. *métamorphose*]: change of form or shape; a transformation (see METAMORPHOSIS): a change in the form of being, as insects (see METAMORPHOSIS OF ORGANS; METAMORPHOSIS OF ANIMALS). MET'AMOR'PHIC, a. *-fĭk,* pertaining to the changes in the earth's strata since their first deposition, by some external or internal agency; applied to the power or force causing the change; a transforming. MET'AMOR'PHISM, n. *-fĭzm,* the state or quality of being metamorphic; the process of transformation; in *geol.,* that change of structure, or of texture, which has been effected on many rocks by the agency of heat, chemical action, or otherwise. METAMORPHOSE, v. *mĕt'ă-mŏr'fōs,* to change into a different form; to transform. MET'AMOR'PHOSING, imp. *-fō-sĭng.* MET'AMOR'PHOSED, pp. *-fōsd:* ADJ. changed into a different form; transformed. METAMORPHIC SYSTEM, in *geol.,* those crystalline schists, as gneiss, quartz-rock, mica-schist, and clay-slate, which underlie all the fossiliferous strata, and in which no trace of organic remains has yet been detected. See METAMORPHIC ROCKS.

METAMOR'PHOSIS, in Ancient Mythology: transformations of human beings into beasts, stones, trees, and even into fire, water, etc. The origin and significance of such fables it is often impossible to determine. Some originated, probably, in observation of the wonderful transformations in nature; some in a misapprehension of the metaphors employed by the older poets; and some, perhaps, in mere superstition and love of the marvellous. The wild imagination of the Orientals filled their mythologies with metamorphoses; and the classic mythology approaches them in this respect. They were the theme of some of the poets and other Greek authors of the Alexandrine period, and of Ovid.

METAMORPHOSIS OF ORGANS.

METAMORPHOSIS OF ANIMALS: change which certain animals undergo after their escape from the envelope of the egg, and which is of such a nature as essentially to alter the general form or the mode of life of the individual. The most remarkable metamorphoses occur in the Batrachians, Crustaceans, Insects, and Tapeworms (see those titles). The change in insects from ovum to larva is sometimes called *transformation;* while the change from larva to pupa and from pupa to imago is *metamorphosis.* A curious case of metamorphosis is that of Axolotl (q.v.) to Amblystoma.

METAMORPHOSIS OF ORGANS, in Botany: made by Goethe a separate branch of botanical science, and called Morphology—a term now used for the science of organic form (see DARWINIAN THEORY). It may almost be said that nothing was known either of the facts or laws of M. till the poet Goethe proclaimed them to the world in his treatise, *Die Metamorphose der Pflanzen,* 1790. Linnæus had, indeed, called attention to the development of organs and the changes which they undergo, and had made this the subject of a *thesis* entitled *Prolepsis Plantarum* in 1760; but, in a manner very unusual with him, he mixed with his observations and philosophical speculations certain fanciful suppositions, whose fallacy, soon becoming apparent, caused all the rest to be neglected. Wolff afterward extricated the true from the fanciful in the views of Linnæus, and gave them greater completeness; but he introduced the subject only incidentally in a paper on comparative anatomy, which failed to attract the attention of botanists, and probably had never been seen by Goethe, whose discovery, apparently altogether original, is one of the finest instances on record of acute observation combined with philosophical generalization.

For the metamorphosis of organs, see titles of the particular organs. Only a very typical general statement of its facts and laws is here made. A plant is composed of the *axis* and its *appendages;* the axis appearing above ground as the stem and branches, below ground as the root. In certain types, as *Sangrimaria,* the axis is entirely below ground. Most of the appendages above ground are essentially *leaves,* all organs which are not formed of the axis being considered as having the origin and structure characteristic of leaves. The proof of this consists very much in the gradual transition of one organ into another, manifest in some plants, although not in others; as of leaves into bracts, one of the most frequent gradual transitions; of leaves into sepals, as seen in the leaf-like sepals of many roses; of sepals into petals, as seen in the petal-like sepals of lilies, crocuses, etc.; of petals into stamens, as seen in water-lilies; and even of stamens into pistils, often exemplified in the common house-leek. The proof is further confirmed and completed by observation of the monstrosities which occur in plants, particularly in the frequent return of some part of the flower to

its original type, the leaf, and in the conversion of one part of the flower into another, which is often the result of cultivation, and is particularly illustrated in *double* flowers, the increase of the number of petals being the result of the conversion of structures which ordinarily should be stamens into petals.

A flower-bud being a modified leaf-bud (see BUD), and a flower therefore the development of a modified leaf-bud, the parts of a flower correspond in their arrangement with the leaves on a branch. But peculiar laws govern the development of organs in each species of plant. Thus the leaves in one are opposite; in another, alternate; in another, whorled; all depending on the law which governs the growth of the axis in relation to the development of leaves, which is very constant in each species; and in like manner the parts of the flower are developed in whorls around an abbreviated terminal portion of the axis, the energies of the plant being here directed to the reproduction of the species, and not to the increase or growth of the individual. The fruit itself, being formed from the pistil, is to be regarded as formed of modified leaves. Goethe truly says: 'The pod is a leaf which is folded up and grown together at its edges, and the capsule consists of several leaves grown together; and the compound fruit is composed of several leaves united round a common centre, their sides being opened so as to form a communication between them, and their edges adhering together.'

The metamorphosis of organs has been investigated with great diligence and success and more clearly elucidated by Miquel, Schimper, Lindley, von Mohl, Schleiden, Nageli, and other botanists. The study of the morphology and metamorphosis of parts and organs is, at present, of great value because of the enlightenment furnished regarding relationship of plants and plant families.

METAPHOR, n. *mĕt'ă-fŏr* [F. *métaphore*—from Gr *metaphŏrā*, a change of one thing for another—from *meta*, over, change; *phorĕō*, I bear, I carry]: figure of speech expressed in a single leading word; a similitude—for example, 'the man is a lion,' is a metaphor; 'the man is as bold as a lion,' is a simile. Metaphor is an ideal characterization or illustration which may be affirmed by one mind and denied by another, or affirmed and denied by the same mind at different times: it is a kind of comparison, in which the speaker or writer, casting aside the circumlocution of the ordinary similitude, seeks to attain his end at once, by boldly identifying his illustration with the thing illustrated. It is thus of necessity, when well conceived and expressed, graphic and striking in the highest degree, and has been a favorite figure with poets and orators and the makers of proverbs in all ages. Even in ordinary language the meanings of words are in great part metaphors; as when we speak of an *acute* intellect or a *bold* promontory: all such words are *in metaphor*, and the *language* may be

called *metaphorical.* METAPHORIST, n. *mĕt'ă-fŏr'ĭst,* one who uses metaphors. MET'APHOR'ICAL, a. *-fŏr'ĭ-kăl,* or MET'APHOR'IC, a. *-fŏr'ĭk,* not literal; containing metaphor; figurative. MET'APHOR'ICALLY, ad. *-kăl-lĭ.*

METAPHOSPHORIC, a. *mĕt'ă-fŏs-fŏr'ĭk* [Gr. *meta,* over, and Eng. *phosphoric*]: designating phosphoric acid combined with one molecule of water.

METAPHRASE, n. *mĕt'ă-frāz* [Gr. *meta,* over, change; *phrasis,* a phrase]: a verbal or literal translation of a language. MET'APHRAST, n. *-frăst,* one who translates verbally. MET'APHRAS'TIC, a. *-tĭk,* literal; close interpretation.

METAPHYSICS, n. sing. *mĕt'ă-fĭz'ĭks* [Gr. *metaphusĭka,* after those things which relate to external nature—that is, after physics—from *meta,* beyond, after; *phusĭkos,* relating to nature—from *phusis,* nature: F. *métaphysique:* It. *metafisica*]: the science of first principles; the doctrine of the nature of ultimate reality in so far as determinable by an analysis of human experience; a unified interpretation of knowledge. The term metaphysics was first applied to a group of philosophical dissertations of Aristotle (q.v.), either because his writings on what he himself called First Philosophy, Theology or Ontology, came after his physical treatises, or, because, as Aristotle himself said, that which is first in order of being is last in order of knowledge. The term metaphysics has since had various meanings. It may be regarded as a doctrine of first principles in philosophy, and, as such, all philosophical disciplines converge in it. It was customary among older writers to divide metaphysics into three parts, Ontology or doctrine of being, Cosmology or doctrine of the world, and Rational Psychology or doctrine of mind. Lotze (q.v.), and Taylor, a recent English writer, follow this division. On the other hand, the influence of Locke, Hume, and especially Kant, has been to put the problems of the nature, limits, and validity, of human knowledge in the forefront. Some writers deny that metaphysics is a genuine science, even in embryo, and would substitute for it Epistemology or theory of knowledge. But, if any knowledge be valid, it must have to do with reality; and a theory of truth can not be separated from a theory of reality or metaphysics. In such a theory, the outcome of investigation into the problems of knowledge must be correlated with a theory of the world in space and time and with a theory of selves or persons in their social, moral, æsthetic, and religious relations. Such a scheme may be only a programme, but the carrying it out would give a theory of experience in its rational totality, which would be a doctrine of reality for us humans. The relation of mind and body, for instance, is a cardinal problem of metaphysics; but we cannot deal with this problem adequately, without taking account of the ethical and æsthetical phases of

experience, as well as of the character and value of our knowledge of the physical order and of minds. In the problem of the freedom of the will ethical and religious considerations are of central importance. Other central problems of metaphysics are the nature of Time, Space, Causality, Substance, Evolution, Personality, Value, Teleology, Evil, Monism and Pluralism, the Absolute. The literature of metaphysics is coincident with that of philosophy. Recent works are by Bradley, Ward, Royce, Fullerton, Ormond, MacKenzie. MET'APHYS'ICAL, a. *-fĭz'ĭ-kăl:* existing only in thought and not in reality; abstract; pertaining to metaphysics. MET'APHYS'ICALLY, ad. *-kăl-lĭ.* MET'APHYSI'CIAN, n. *-fĭ-zĭsh'ăn,* one versed in the science of metaphysics.

METAPLASM, n. *mĕt'ă-plăzm* [F. *métaplasme*—from Gr. *metaplas'mos,* a transformation—from *meta,* beyond, over; *plasso,* I form]: in *gram.* or *rhet.,* a general term used to embrace all those figures of speech which designate changes in the letters or syllables of a word; in *bot.,* the matter which gives the granular character to protoplasm in a living cell.

METAPODES, n. plu. *mĕt-ăp'ō-dēz* [Gr. *meta,* after, change; *podēs,* feet]: the hind legs.

METAPODIUM, n. *mĕt'ă-pō'dĭ-ŭm* [Gr. *meta,* beyond, after; *podēs,* feet]: the posterior lobe of the foot in mollusca.

METAPOPHYSIS, n. *mĕt'ă-pŏf'ĭ-sĭs* [Gr. *meta,* beyond; *apoph'usis,* a spout, a process]: the mammillary processes of the vertebræ, according to Owen.

METAPTOSIS, n. *mĕt-ăp-tō'sĭs* [prefix *meta-;* Gr. *ptosis,* a falling]: in *med.,* any change in the form or seat of a disease.

METASPERMS, n. plu. *mĕt'ă-spėrmz* [Gr. *meta,* beyond; *sperma,* seed]: in *bot.,* another name for ANGIOSPERMS, which see.

METASTASIO, *mā-tâs-tâ'ze-o* or *mĕt-a-stâ'ze-o* (originally TRAPASSI), PIETRO: one of Italy's most admired poets: 1698, Jan 6—1782, Apr. 12; b. Rome; of humble parentage. He gave early evidence of genius by his boyish improvisations. Metastasio having attracted the casual notice of Gravina, famous jurisconsult, the latter undertook the entire education and career of the youth, whose paternal name of Trapassi became thenceforward Grecized into Metastasio, both words being identical in signification. The young poet speedily advanced in classical and general knowledge; and to his patron's enthusiastic devotion to the Greek drama may doubtless be traced much of the after-bent of Metastasio's own poetical tastes. By the early death of Gravina, Metastasio was placed in possession of considerable property. In 1724 he published one of his most celebrated dramas, *La Didone,* which, with *Il Catone* and *Il Siroe,* conferred on the poet a European name. In 1730 Met-

astasio accepted the post of poet-laureate to the imperial court of Vienna. During his sojourn in Vienna, Metastasio composed *Giuseppe Riconoscinto, Il Demofonte,* and the *Olimpiade.* He died at Vienna. Metastasio was amiable and attractive in person and manner; he was of somewhat timid disposition. Two persons, after Gravina's death, became so impressed with his talents and attracted by his personal charm, that they practically made him a pensioner on their bounty—one, the great Roman prima-donna Marianna Bulgarelli (called La Romanina); the other, Countess Althann, in Vienna. His works are very numerous, embracing 63 dramas, 48 cantatas, besides numberless elegies, canzonette, sonnets, and translations. They have unexampled popularity among all grades of his countrymen; in their pure classical subjects and forms, the educated student finds instruction and delight; while their facile musical grace and verbal simplicity adapt them to the popular appreciation of the artless beauties of poetry. The best editions of Metastasio are those of Turin (1757, 14 vols.); Paris (1755, 12 vols.); Paris (1780, 12 vols., large 8vo); Genoa (1802, 6 thick vols.); Mantua (1816-20, 20 vols.).

METASTASIS, n. *mĕ-tăs'tă-sĭs* [Gr. *metastăsis,* a change of form or place—from *meta,* over; *stasis,* a placing or setting, a posture]: removal of a disease from one part of the body to another—e.g., rheumatism, gout, mumps, etc., some of which fly from joint to joint, others from the tissues of one organ to the analogous tissue in another kind of organ. The term is also employed to denote the appearance of a secondary malignant growth in some tissue or organ at a distance from the site of the original cancerous tumor. Metastasis is applied also to the removal of food-products, as starch, sugar, etc., from one part of a plant to another.

METASTOMA, n. *mĕ-tăs'tŏ-mă,* or METASTOME, n. *mĕt'ă-stōm* [Gr. *meta,* after; *stoma,* the mouth]: the plate which closes the mouth posteriorly in crustaceans.

METATARSUS, n. *mĕt'ă-târ'sŭs* [Gr. *meta,* beyond, over; *tarsos,* the sole of the foot]: the part of the foot between the ankle and the toes. METATARSAL, a. *mĕt'-ă-târ'săl,* pertaining to the metatarsus or instep: N. the metatarsal bone.

METATHESIS, n. *mĕ-tăth'ĕ-sĭs* [Gr. *metathĕsĭs,* change—from *meta,* beyond, over; *tithēmī,* I put or place; *thesis,* a placing]: a term designating the transposing of the letters or syllables of a word; in *surg.,* an operation by which a morbific agent is removed from one place to another, where it may produce less disturbance, e.g., in couching for cataract.

METATHORAX, n. *mĕt'ă-thō'răks* [Gr. *meta,* beyond, over, and *thorax,* the chest]: in *insects,* the third and last segment of the thorax—the second being called *mesothorax.*

METAURUS, *me-tâ'rŭs*, or METAURO, *mā-tō'rō*, Italy: a river in the Marches, which flows n.e. past St. Angelo in Vado, and falls into the Adriatic, s.e. of Fano; total course, about 50 m. It is noted for the victory gained by the Romans under the consuls Claudius Nero and Livius Salinator near its banks over the Carthaginians under Hasdrubal 207 B.C.

MÉTAYER, n. *mā-tā'yėr* [F. *métayer*, a farmer—from mid. L. *medĭĕtārĭŭs*—from *medĭŭs*, middle]: cultivator of a farm, under stipulation to give the landlord a portion of the produce as his rent. In some older French dictionaries, e.g., that of Trevoux, the word is said to apply to any kind of farmer; but in the oldest dictionary of French and English, Cotgrave's, the word is thus interpreted: 'Properly one that takes ground, to the halves, or binds himself by contract to answer unto him of whom he holds them half, or a great part of the profits thereof.' The term has lately got a meaning in political economy on account of some eminent writers having raised the question, whether this arrangement between landlord and tenant is not so much more advantageous than any other, both to the parties immediately concerned, and to the public at large, that it ought to be specially encouraged. Sismondi appears to have been the first to open this wide view of the influence of the practice, and he has given a chapter to its consideration in his Political Economy (b. iii. chap. 5). He says what cannot be denied, that such an arrangement was a great improvement on mere serfdom, which gave the cultivator no interest in the produce of his industry. But in giving the reasons for his administration of the system as one which provides in the general case for the wants of the peasants while relieving him of all anxiety about markets and prices, he admits that a métayer peasantry never advance beyond the humble, happy, and contented lot which immediately falls to them. It is a system, therefore, inconsistent with the application of large capital to cultivation, and consequently with the extraction of the highest value which the soil can yield.

METCALF, VICTOR HOWARD, LL.B.: lawyer, congressman and executive officer: b. 1853, Oct. 10, at Utica, N. Y. He received his preliminary education at the Utica Free Academy, and Russell's Military Academy, at New Haven, Conn., after which he took a law course at Yale College, graduating in 1876. He was admitted to practice in the Supreme Court of the State of Connecticut the same year, and the following year he was admitted to the New York bar; but in 1878 he removed to Oakland, Cal., where, in 1881, he became a member of the law firm of Metcalf & Metcalf. In 1898, 1900, and 1902, he was elected to Congress as a Republican, from the Third California district; he was secretary of

the Department of Commerce and Labor 1904, July 1—1906, Dec. 16; and since the latter date secretary of the navy.

METCHNIKOFF, *mĕch'nĭ-kŏf,* Iliya: Russian cytologist and embryologist: b. in the province of Kharkov, 1845, May 15. He received his early education at Kharkov and later pursued his studies at Giessen and Munich. In 1870 he was appointed to the chair of zoology at Odessa, but after 12 years of labor in that position resigned in order to devote himself to private research, studying particularly sponges and polyps. As a result of this study he published in 1882 a remarkable paper on the intracellular digestion of invertebrates, in which he showed that the individual cells of sponges, in order to provide material on which the young might grow, absorbed solid particles of food and digested them. In 1884 he advanced the theory that the struggle between the white or amœboid corpuscles of the blood and the disease germs within it causes the inflammation in the vertebrates. Metchnikoff subsequently went to Paris, in 1892 became *chef-de-service* in Pasteur's Institute, and upon the death of Pasteur in 1895 became director of the Pasteur Institute. His works include: *Untersuchungen über die intracelluläre Verdauung bei wirbellosen Thieren,* in *Arbeiten aus dem zoologischen Institut der Universität Wien,* vol. V. (1883; ib., 1884); *Ueber die Beziehung der Phagocyten zu Milzbrandbacillen,* in *Virchow's Archiv für pathologische Anatomie und Physiologie,* etc., XCVII., p. 502 (1884; ib., 1892); *Leçons sur la pathologie comparée de l'inflammation* (Paris 1892); *The Nature of Man* (1903); etc.

METE, v. *mēt* [Goth. *mitan;* Dut. *meten,* to measure: OF. *metre,* metre—from L. *metrum;* Gr. *metron,* a measure: L. *metīrī,* to measure]: to measure; to ascertain the dimensions or capacity of by a standard. Me'ting, imp. Me'ted, pp. Meter, n. *mē'tėr,* an instrument that measures, as *gas-meter* (see Gas, Lighting by). Metestick, on *shipboard,* a measure used to preserve proper levels in storing cargo.

METELLUS, *mē-tĕl'ŭs:* a Roman family, the most important of the plebian gens Cæcilia, which rose to be one of the first families of the Roman nobility.—One of its most distinguished members was Quintus Cæcilius Metellus Macedonicus, who received his surname from his victory over Andriscus, an aspirant to the throne of Macedonia (b.c. 148). His life was considered by ancient writers an example of the greatest felicity; before his death three sons had been consuls, one censor. He died b.c. 115.—Another was Quintus Cæcilius Metellus Numidicus, who twice defeated Jugurtha in Numidia (b.c. 109), and was noted for integrity, but was superseded in his command by Marius.—His son, Quintus Cæcilius Metellus, surnamed *Pius,* joined

Sulla, B.C. 83, but sought to moderate the severity of his proscriptions. He, too, bore a distinguished character for virtue.—QUINTUS CÆCILIUS METELLUS CRETICUS conquered Crete and reduced it to a Roman province (B.C. 67).—QUINTUS CÆCILIUS METELLUS PIUS SCIPIO, sometimes called QUINTUS SCIPIO, and sometimes SCIPIO METELLUS, was son of Publius Cornelius Scipio, who was adopted by one of the Metelli, and became the father-in-law of Pompey, and his zealous partisan. He commanded under him at Pharsalus, maintained war on his behalf for some time in Africa; and after his defeat at Thapsus (B.C. 46), died by his own hand. He was selfish and licentious.

METEMPIRICAL [Gr. *meta,* beyond, and *empeiria,* experience]: that which is beyond or transcendent of experience. A term ascribed to G. H. Lewes.

METEMPSYCHOSIS, n. *mĕ-tĕm'sĭ-kō'sĭs* [Gr. *metempsuchōsis,* the passage of the soul from one body to another—from *meta,* beyond, over; *psuchē,* life]: the passing of the soul of a man after death into the body of another man or into a lower animal, or through a succession of them; transmigration. See TRANSMIGRATION OF SOULS.

METEMPTOSIS, n. *mĕt'ĕm-tō'sĭs* [Gr. *meta,* after; *emptōsis,* a falling upon]: the solar equation necessary to prevent the new moon happening a day too late; the omission of leap-year every 134 years: *proemptosis* is the addition of a day every 330 years, and another every 2,400 years.

METENSOMATOSIS, n. *mĕt'ĕn-sō'mă-tō'sĭs* [Gr. *meta,* change; *en,* in; *soma* or *somăta,* a body]: the change or transmutation of the elements which have formed one body into the substance of other bodies, similar or dissimilar.

METEOR, n. *mē'tē-ėr* [F. *météore*—from Gr. *metĕōrŏs,* raised high above the earth, sublime: It. *meteora*]: any natural phenomenon or appearance of a transitory nature taking place in the atmosphere; a luminous body or appearance in the sky; a falling star (see METEORS). ME'TEOR'IC, a. *-ŏr'ĭk,* pertaining to meteors; of or belonging to the atmosphere; produced in or falling from the atmosphere; applied figuratively to any person or thing on account of brilliancy or irregularity, or both. ME'TEORIF'EROUS, a. *-ĭf'ėr-ŭs* [L. *fero,* I bear]: bearing or producing meteors. METEORITE, n. *mē'tē-ŏr-īt,* a stone or body falling from the higher regions of the atmosphere, or from regions without it; also ME'TEOR'OLITE, n. *-ōr'ō-līt* [Gr. *lithos,* a stone] (see AEROLITE; METEORS). METEOR'OSCOPE, n. *-ō-skōp,* instrument for taking angles, and making measurements of the heavenly bodies. METEOROUS, a. *mē-tē'ō-rŭs,* having the nature of a meteor. METEORIC IRON, the iron found in meteoric stones, principally an alloy of iron and nickel. METEORIC STONES, those masses of hard matter which

frequently fall on the earth from the upper regions; aerolites.

METEOROLOGICAL, a. *mē'tē-ŏr-ō-lŏj'ĭ-kăl* [Gr. *metĕōros*, raised high above the earth; *logos*, a discourse]: relating to the atmosphere and its phenomena; pertaining to a register or table of the state of the air and its temperature, etc.; also ME'TEOROLOG'IC, a. *-lŏj'ĭk*. METEOROL'OGY, n. *-ŏl'ŏ-jĭ*, the science which explains the various phenomena which have their origin in the atmosphere. See METEOROLOGY. ME'TEOROL'OGIST, *-jĭst*, one versed in the various phenomena appearing in the atmosphere. METEOROGRAPH, n. *mē'tĕ-ĕr-ō-grăf*, apparatus for registering meteorological phenomena. METEOROGRAPH'IC, a. *-ō-grăf'ĭk*, pertaining or relating to meteorography. METEOROG'RAPHY, n. *-ŏg'ra-fĭ*, meterology; the registration of meteorological phenomena. METEOROM'ETER, n. *-ŏm'ĕ-tĕr*, in *teleg.*, apparatus for receiving at a local station, transmitting to a central station, by telegraph-wires, and there recording, the direction and velocity of the wind, condition of the barometer and thermometer, and amount of rainfall.

METEOROLOGY: Originally pertaining to all the phenomena that one might observe in the atmosphere or by looking into the sky, has come to mean that important part of natural philosophy that treats of the physics of the air and of the mechanics of its motions; its temperature, moisture, electrification and other properties. That is to say: Meteorology treats of weather and climate; the distinction between the two terms is made plain by the statement that one may speak of the *weather* of to-day, or last month, or some past year, but not of the *climate* of a day, a month, or a year, which is ascertained by a study of continuous weather records for long periods of years. For more details of this subject than are published in this article, see such titles as AEROLITE, ATMOSPHERE, BAROMETER, THERMOMETER, BOILING, CLOUDS, DEW, ELECTRICITY, EVAPORATION, FOG, HAIL, HALO, LIGHTNING, MAGNETISM, METEORS, DUST (meteoric), RAIN, SNOW, STORMS, CYCLONES, etc.

The early philosophers wrote of the weather, but they made little attempt to explain the phenomena that appeared so irregular and capricious. Aristotle, Cicero, Virgil, and a few others wrote on the subject without making any material contributions to the knowledge of the air. They were all ignorant of every department of physical science, and their explanations were, therefore, vague and often absurd. It was impossible to make progress until instruments were invented with which to measure at least the temperature and pressure of the air. In this connection it is interesting to note that at the time of the founding of the first of the thirteen original colonies at Jamestown, Va., in 1607, practically nothing was known of the properties of the air or of the methods of measuring its phenomena. To-day,

at over 200 stations in the United States, Canada, and the West Indies, electrically-recording automatic instruments measure and transcribe, for each moment of time, the air pressure and temperature, the velocity and direction of the wind, the beginning and ending of rainfall, the amount of precipitation, and the duration of sunshine. Every progressive nation is now spending public money to apply our limited knowledge of meteorological science to its various industries, and devoting the talents of some of its ablest scientists to the study of climate with relation to its effect upon health, business, and the products of the soil; and the making of forecasts of coming changes in the weather, with the view of saving life and property that might otherwise be exposed to the fury of storms, or to the withering effects of freezing air or of abnormal heat.

The weather will receive the larger share of our attention. It will be well first to learn something of the physical aspects of the atmosphere.

How Atmospheres are Formed.—Atmosphere (Greek, vaporous sphere). The larger the planet the longer is the time that must elapse before the heavy vapors of earth and metal which largely occupy its atmosphere during the period of its incandescence cool and precipitate into a solid crust, leaving an attenuated residual of such density and constitution as to admit of the beginning of life. Conversely, the smaller a planet is the quicker will its atmosphere reach the conditions of life, the sooner will the life-sustaining fluids be absorbed into its rocks or dissipated into space, and the earlier will a mantle of death, desolation and eternal silence be spread over its face.

The processes of nature are always adding to some of the constituent gases of the atmosphere in some way, and transforming or taking from them in other ways. On the earth, at least, the loss and the gain are so nearly equal as to maintain a nearly constant condition. Marked changes have taken place, however, in long geologic periods. The early atmosphere probably contained large quantities of carbon dioxide which were absorbed by the rank vegetable growth that now forms the coal beds of the earth, and the slowly cooling rocks that constituted the crust. In consequence it may be said that our present atmosphere is what remains after the earth had absorbed of its gases nearly to completion, and after the lighter gases, like hydrogen and helium, which seem to have too great a molecular velocity to be imprisoned by the earth's attraction of gravitation, had been dissipated into space. Somewhat similar processes may be assumed to be taking place on the other planets, or to have taken place.

Gases that could not be held by the moon might be imprisoned by the earth, and those that could escape from the earth might be held by the larger planets. It would appear that the earth's gravitation and the temperature of its outer air are such as to retain, without

appreciable loss, argon, carbon dioxide, oxygen, nitrogen, vapor of water, and ammonia, but that helium and hydrogen escape from the top of the atmosphere about as fast as they are supplied from the hot springs and other sources at the bottom.

Height of the Earth's Atmosphere.—Exact computation has shown that if the air were of the same density at all elevations, which it is not, it would only extend upward to a distance of five miles. From the decreases of density with elevations that have been measured, it is known that only .005 inch of pressure can be exerted by the air at a height of 30 miles, and that at 50 miles the atmosphere must be too tenuous to manifest a measurable pressure; yet it is sufficient at the latter elevation to refract or turn from its initial course an appreciable amount of the sun's rays at sunrise and at sunset, thereby affecting the duration of twilight.

The appearance of meteors, which are rendered luminous by striking into the earth's atmosphere, and whose altitudes have been determined by simultaneous observations at several different places, reveal the presence of air (probably vaporous hydrogen) at a height of nearly 200 miles, but not air of the density or composition of that near the earth.

With increase in elevation beyond 12 miles, we may assume that the heavier gases steadily lose in proportion to the lighter gases, unless the lighter be condensed by cold (as is the case with water vapor at only slight elevations), and their further expansion upward checked, until at about 60 miles nothing but hydrogen remains. Certain it is that heavier gases have a tendency to accumulate in the lower part of any stratum that is not undergoing convectional mixing, such for instance as that next above the turbulent region in which storms operate—and that the lighter gases become relatively greater in the higher regions of steady equilibrium.

Atmospheric Air.—The earth is surrounded by three principal atmospheres and others of less importance, each comporting itself, in accordance with Dalton's law, precisely as it would do if the others were not present, except that its rate of diffusion is retarded by the presence of the others. This composite is *atmospheric air*. It can be easily compressed because there is space between its molecules, which are in constant vibration. The doubling of its pressure reduces its volume one half; this is in accordance with the law discovered independently by Boyle and Mariotte, which is as follows: The temperature remaining the same, the volume of a given quantity of gas varies inversely as the pressure that bears upon it.

According to Regnault, at the temperature of melting ice and at ordinary atmospheric pressure a cubic foot of air that has been freed from water vapor weighs 1.294 ounces. When a mass of air at standard pressure

is heated so as to raise its temperature from the freezing to the boiling point, its volume being confined so as to remain constant, its pressure is increased .36717 atmospheres, which is the mean of the results obtained by several different investigators. According to Wiedemann, the specific heat of air, the pressure remaining constant, is .2389; the volume being kept constant, instead of the pressure, the specific heat is .1715. According to Regnault's determination air expands $\frac{1}{491.4}$ of its bulk for every degree on the Fahrenheit scale. The increase of unit volume for one degree is called the coefficient of expansion. All gases have the same coefficient of expansion, i. e., $\frac{1}{491.4}$ for each increase of one degree Fahrenheit, and the expansion is uniform except at very high and very low temperatures.

Constituent Gases of the Air.—Air is composed almost entirely of oxygen and nitrogen mechanically mixed and not in chemical combination, in which the proportion is about 20.9 parts of oxygen to 78 parts of nitrogen. It should not be thought that because some of the other constituent gases are relatively small in amount they are not vitally important in the carrying on of the functions that nature seems to have assigned to the air. In addition to oxygen and nitrogen, the air contains small quantities of many other substances: vapor of water, carbon dioxide, argon, nitric acid, ammonia, ozone, hydrogen, helium, xeon, crypton, neon, as well as organic matter, germs, and dust in suspension. Over the land it contains sulphates in minute quantities, and over the sea and near the sea shore salt left from the evaporated spray can always be detected.

The relative proportion of the gases of the air is practically the same in all parts of the open country, and nearly the same at all elevations up to the height of ten or twelve miles. In large cities there is an increase of carbon dioxide, and in closed places of public assembly and in mines and in confined areas where considerable combustion—either by fire or by rotting—is taking place there may be a total absence of ozone and a marked decrease in the amount of oxygen and a corresponding increase in the amount of carbon dioxide. The quantity of water vapor in the air may vary from a fraction of one per cent. by weight for the arid regions to five per cent. for the humid regions.

In dry air the general proportion of the gases per 100 parts may be stated to be as follows:

GAS.	By weight.	By volume.
Nitrogen	75.46	78.04
Oxygen	23.19	20.99
Argon	1.30	0.94
Carbon Dioxide	0.05	0.03

The remaining gases that compose the air are relatively too small in quantity to be considered in the making of this statement.

Heat, Light and Temperature.—Light, radiant heat, and electro-magnetic vibrations are simply different

forms of energy. Their identity is shown by the fact that they obey similar laws of propagation, refraction, polarization, interference, and reflection, and that they travel at the same velocity—186,400 miles per second—passing from the sun to the earth in about 8 minutes.

The sun, with an absolute temperature over twenty times as high as the absolute temperature of the surface of the earth, controls the surface temperature of our planet and its atmosphere. To the radiant energy emitted by the sun and as received by the earth is given the special name of *insolation*. It is neither heat nor light while it is being transmitted through space, but simply waves, pulses, or vibrations in the hypothetical continuous ether. About one-half of the solar radiation that falls upon the outer limits of our atmosphere reaches the earth; the remainder is absorbed by the water vapor, and by the dust motes and particles of clouds suspended in the air. The radiation that reaches the earth's surface becomes appreciable to our senses as heat and light.

Distribution of Insolation.—The quantity of heat that falls upon a given area at the top of the earth's atmosphere depends upon three conditions: (1) The altitude that the sun attains when it crosses the meridian at noon; (2) the length of day time, and (3) the distance of the earth from the sun; and these are in a perpetual state of variation, except that near the equator the day and the night are always equal. The distance from the sun varies because the orbit of the earth is an ellipse with the sun in one of its foci; and there is a variation in the time that the sun remains above the horizon each day and the height that it reaches at midday, because the earth's axis is not perpendicular to the plane of its orbit but departs therefrom 23½ degrees, and does not materially change its direction as the earth pursues its annual course.

In consequence of the varying length of the day, the distribution of insolation is not simple. We will first consider what would be the distribution without an atmosphere. The rapidly increasing length of the day towards one of the poles soon more than compensates for the decreasing angle at which the solar rays strike the earth. This is shown by the following table which gives the proportional amount of insolation received in 24 hours at different latitudes and at different times of the year, the amount of insolation received at the equator on March 20th being taken as unity.

PROPORTIONAL AMOUNTS OF INSOLATION.

Latitude.....	0°	+20°	+40°	+60°	N. Pole +90°	S. Pole −90°
March 20.....	1.000	0.934	0.763	0.499	0.000	0.000
June 21.....	0.881	1.040	1.103	1.090	1.202	0.000
Sept. 22.....	0.984	0.938	0.760	0.499	0.000	0.000
Dec. 21.....	0.942	0.679	0.352	0.000	0.000	1.284

Such would be the distribution of insolation in the absence of an atmosphere, and probably the conclusion

reached—the large amount of heat received at the pole—was somewhat unexpected. If we now sum up the insolation received at different latitudes during the entire year, it must be remembered that the latitudes which have unusually long days in summer have equally long nights in winter, which makes the calculation of the total amounts received rather a difficult problem. It has been solved, however, by Meech and Angot. The following table gives the total yearly insolation for every 5 degrees of latitude, expressed in thermal days; that is, the unit is the average total daily insolation at the equator, which necessarily receives 365¼ such units a year.

ANNUAL AMOUNTS OF INSOLATION.

Lat.	Thermal Days.	Difference.	Lat.	Thermal Days.	Difference.
5°.....	364.0	1.2	50°.....	249.7	20.1
10°.....	360.2	3.8	55°.....	228.8	20.9
15°.....	353.9	6.3	60°.....	207.8	21.0
20°.....	345.2	8.7	65°.....	187.9	19.9
25°.....	334.2	11.0	70°.....	173.0	14.9
30°.....	321.0	13.2	75°.....	163.2	9.8
35°.....	305.7	15.3	80°.....	156.6	6.6
40°.....	288.5	17.2	85°.....	152.8	3.8
45°.....	269.8	18.7	90°.....	151.6	1.2

Annually the pole receives 41 per cent. of the amount of insolation that reaches the equator, while it would receive no insolation whatever if the axis of the earth were not inclined from the perpendicular to its orbit. The annal insolation varies but little with change of latitude near the equator and near the pole; the most rapid variation occurs between latitude 50° and 60° N.

Quantity of Heat Absorbed by the Atmosphere.—Heretofore we have treated of insolation without taking into account the quantity absorbed by the earth's atmosphere, which varies with the hour of the day and the season of the year; and with the amount of water vapor and clouds and other matter in suspension which affect its transparency.

The effect of the atmosphere upon radiation passing through it is qualitative and quantitative; some of the rays of light are absorbed, others are scattered. When the sun is in the zenith at noon the rays strike the surface perpendicularly and have to pass through the shortest distance possible; but for latitudes far north or south of the equator, the rays are more oblique, and must pass through an ever-increasing thickness of air. Consequently the intensity of radiation at high latitudes decreases not only on account of the greater obliquity of the sun's rays towards the surface, but also because of the longer path of atmosphere traversed, which causes a further loss of heat by absorption and diffuse reflection. Even in our latitudes when the sun is near the horizon its power is so much diminished that one can look at the disk with unprotected eye. Higher latitudes, therefore, on account of the presence of the atmosphere are much more unfavorably situated

with reference to the amount of heat received than was first calculated. Of course the dark rays absorbed by the atmosphere, chiefly those of long wave-length in the infra-red, have effect in warming the air, and in addition the scattering of short waves by diffuse reflection causes the atmosphere itself to become a considerable source of heat, which is of much importance in high latitudes on account of the long duration of twilight.

With a clear sky and a low percentage of humidity not over 75 per cent. of the direct insolation reaches the earth when the sun is vertical, and the amount decreases rapidly with the greater inclination of the rays, especially upon a horizontal surface. The rate of decrease becomes still more rapid with a decrease in the transparency of the air or an increase in the cloudiness.

At best only a fraction of the amount that falls upon the upper air reaches the earth. The value of this fraction depends upon the transparency of the atmosphere and the total mass of air traversed, the latter varying with the obliquity of the rays. The fraction expressing the part that reaches the earth's surface when the sun is in the zenith is called the coefficient of transparency. Considering the whole earth, about one-half of the sun's rays are directly absorbed by the air, and the remaining half reach the earth.

Terrestrial Radiation.—When solar rays are intercepted and absorbed, either by matter in suspension or by the earth itself, the energy of the imponderable ether is transmuted into molecular vibrations of the ponderable matter that absorbs them. The temperature of the matter is raised, and it itself sends out heat rays which, like solar radiation, readily escape from the atmosphere, unless intercepted in their passage by fog, or cloud, or dust, or water vapor. The idea that the clear atmosphere itself acts as a trap for the long waves that are convertible into heat—allowing them to enter but preventing their escape—is not now generally accepted.

The same amount of heat will raise the temperature of a water surface only about one-fourth as much as it will raise the temperature of a land surface. Water rejects by reflection a considerable amount of insolation that reaches it, while land reflects but a small part, and of that that falls upon the top layer of water much is employed in the process of evaporation and does not impart any warmth to the water. Heat so disposed of is said to be latent. These conditions give to large water surfaces and the air immediately over them a much lower temperature during the day and a much higher temperature during the night, and also lower temperatures during summer and higher temperature during winter, than occur over a land surface at the same latitude. This explains the difference between a marine and a continental climate.

Change of Temperature with Latitude and Altitude.—The mean annual temperature at the equator is about 80° F.; and at the north pole zero—a difference of 80° in about 6,250 miles. If instead of moving northward from the equator one were to be carried directly upward, the same difference in temperature that exists between the air at the equator and that at the poles would be found between the air at the surface of the earth and that at an elevation of 27,000 feet, where a temperature of zero probably undergoes slight changes —if any—from one season to another. From the surface upward the annual variations cease at about 35,000 feet; and the diurnal variation at a height of less than 5,000 feet. Generally speaking, along the surface northward from the equator the diurnal variation is known to *decrease* with latitude, and the annual variation to *increase*, except that the annual variation is greater in the north-central parts of the continents of Asia and North America than at the poles, which fact is due to the greater heating and the greater cooling effect of land than of water. The average decrease of temperature with elevation is about one degree Fahrenheit in 300 feet.

Humidity.—The amount of water vapor that the air can contain varies with the temperature. The amount contained is on the average greater during the day and less during the night, although the relative moisture is greater at night because the capacity of air for water vapor decreases rapidly with falling temperature. If the air be near the saturation point, it requires but a slight lowering of the temperature to precipitate a part of its water vapor in the form of dew, frost, rain, snow, or hail. This is the reason that it is usually called water vapor, instead of a gas. Water vapor may vary in amount from a fraction of one per cent. to 5 per cent. of the weight of the air. Its marvelous capacity for the absorption of heat causes it to be an important factor in many meteorological processes. It occupies space nearly the same as though the other atmospheres were not present, practically the same amount being necessary to saturate a given space, whether it be a vacuum or be filled with air, provided the temperature in both cases be the same. With each increase of 18 to 20 degrees in temperature the capacity of air for water vapor is doubled; thus on a cold day in winter it may form no more than 0.001 part of the air, but on a hot day in midsummer near or over large bodies of water it may constitute as much as one-twentieth part by weight of the lower air. The *dew point* is the temperature of saturation. The *absolute humidity* is expressed in grains to the cubic foot; the *relative humidity* in percentages of the amount necessary to saturate, and as previously stated this amount varies with the temperature, doubling for each increase of about 18 degrees.

Climate.—Climates may be broadly divided into marine, continental, mountain, and plain, with the many variations produced as these conditions gradually or precipitately shade off, the one into the other.

If the earth were all water or all land, and if the land were everywhere of the same elevation, most of the factors that cause variations in climates—often considerable for regions closely contiguous—would be eliminated from the equation. Every point on the same parallel of latitude would have the same mean annual temperature, and the same average heat in summer and the same average cold in winter. New York and London, separated by eleven degrees of latitude, would not, as now, have about the same mean annual temperature; and New York would not have warmer summers and colder winters than London. If the surface of the earth were all water there would be no such extremes of heat and cold as we now know. There would be no frost within 35° or 40° of the equator, and zero temperatures would be recorded only in regions within 30° of the poles. If it were all land, the heat would be much more intense than now in the tropics, and in the temperate and frigid zones the heat of summer and the cold of winter would reach extremes unknown at this time.

All the anomalies of climates are caused by the different specific heat capacities of land and water; their different powers of conduction and radiation; the irregular distribution of these two surfaces; the widely-varying elevations of the land; the trend of mountain ranges; the prevailing direction of the winds, and the carrying of large quantities of heat by ocean currents from the equator toward the poles, and the relative quantities of cloud and rain or snow.

Marine climates are warmer in winter and colder in summer than continental climates. In the middle latitudes, land areas that lie on the east of oceans have marine climates on their western sides and for a considerable distance inland, because the atmosphere drifts from the west and partakes largely of the thermal conditions of the surface over which it travels; except where high coastal ranges of mountains intercept the vaporous currents from the ocean, precipitating them upon their ocean side and allowing only the partly dried air to cross the mountain tops into the interior. The Bermuda Islands, in the North Atlantic Ocean, have a mean daily range of temperature of only 10° F., and an annual range of only about 50°; while Memphis, Tenn., near the same latitude in the interior of a large continent, has a daily range of 17° and an annual range of 112°.

All regions bordering closely on the ocean partake of both climates, the predominating one being determined by the direction in which the coasts trend, their elevation, and the direction and force of the prevailing winds.

Change of Climate.—There has been no appreciable change in the climate of any large area within the period covered by authentic history, notwithstanding the popular notion to the contrary. During geologic periods important changes have occurred, but they have taken place so slowly that thousands of years have elapsed before their effect has been appreciable.

Air Pressure and Wind.—Obeying the law of gases, the atmosphere exerts a pressure in all directions. The pressure decreases with increased altitude, because there is less air above the higher the ascent. At sea level, the average pressure of the air is about 15 pounds per square inch, which is sufficient to sustain a column of liquid mercury 30 inches high in the vertical vacuum tube of the barometer. At the height of 16,000 feet, there is only enough atmosphere remaining above to exert a pressure that will sustain the mercury at a height of 16 inches; and at 30 miles high the pressure is calculated to be not over .005 of an inch.

The unequal heating of the atmosphere between the equator and the poles causes the air in the latter regions to expand, rise, and move poleward. These air currents are called wind. There are conflicting currents, as the same amount of air that flows northward must in some manner return to the equator. In this agitation, vortical action occurs, which constitutes the fundamental storm areas that drift eastward in the middle latitudes and westward in the tropics. The velocity with which the wind will move from one region to another bears relation to the difference in the pressure between the two regions, the atmosphere flowing from the region where the pressure is high toward the region where the pressure is less.

Forecasting the Weather and Storms.—It is essential to a comprehension of the problems involved in the making of forecasts that one gain a knowledge of the methods of gathering meteorological observations and making weather reports. Each morning at 8 o'clock—75th meridian time—which, by the way, is about 7 o'clock at Chicago, 6 o'clock at Denver, and 5 o'clock at San Francisco—the observers at about 200 weather bureau stations scattered throughout the United States and the West Indies take their observations, and, with the aid of carefully tested instruments, note the pressure of the air, the temperature, the humidity, the rainfall or snowfall, and the cloudiness. By 8:15 the observations have been reduced to cipher for the purpose of brevity, and each has been filed at the local telegraph office. During the next 30 to 40 minutes these observations are speeding to their destination, each station contributing its own observation and receiving in turn, by an ingenious system of telegraph circuits, such observations from other stations as it may require.

As fast as the reports come from the wires they are entered on blank charts of the United States. One

clerk constructs a chart showing the change in temperature during the preceding 24 hours. A second clerk constructs a chart showing the change that has occurred in the barometer during the past 24 hours. As in the construction of the temperature chart, broad, heavy lines of red separate the regions of rising barometer from those of falling barometer. Narrow lines inclose the areas over which the change in barometer has been greater than one-tenth, and so on. This chart is extremely useful to the forecaster, since it indicates whether or not the storm centers are increasing or decreasing in intensity, and, what is of more importance, it gives in a great measure the first warning of the formation of storms.

A third clerk constructs a chart called the general weather chart, showing for each station the air temperature and pressure, the velocity and direction of the wind, the rain or snowfall since the last report, and the amount of cloudiness. Then lines, called isobars, are drawn through places having the same pressure. By drawing isobars for each difference in pressure of one-tenth of an inch, the high and the low pressure areas are soon inclosed in their proper circles. The word 'High' is written at the center of the region of greatest air pressure, and the word 'Low' at the center of the area of least pressure. Under the influence of gravity the air presses downward and outward in all directions, thus causing it to flow from a region of great pressure toward one of less.

Cyclonic Storms.—The air moves spirally inward toward the center of the cyclone; arriving near the center it ascends and may precipitate rain or snow as it cools by expansion, or as it mingles with air of a lower temperature than its own; in the northern hemisphere it rotates about the center of the low in a direction contrary to the movement of the hands of a watch. The air pressure is less at the center and greater around the periphery of the cyclone. The velocity of gyration of the air as it moves spirally inward will bear direct relation to the difference in pressure between the center of the storm and the region outside of the storm.

Storms are carried along by the general easterly movement of the atmosphere in the middle latitudes of both hemispheres and by the westerly movement of the general circulation in the tropics.

Anticyclonic Storms.—In the anticyclone all the functions of the cyclone are reversed; hence the name. The air has a downward component of motion at and for a considerable distance about the center, instead of an upward component; the winds blow spirally outward from the interior instead of inward; and the air is mostly clear, cool and dry, instead of cloudy, warm and humid.

Winter and Summer Storms.—These are winter conditions that are being described. The storms are general,

not local, as in summer, when the highs (anticyclones) and the lows (cyclones) exhibit small differences of pressure, move slowly, and seldom embrace large areas.

Hot Waves.—For some reason there come, in summer, periods of stagnation in the drift of the highs and the lows. At such times, if a high sluggishly rests over the south Atlantic Ocean between Bermuda and the coast of the United States, and a low over the northern Rocky Mountain regions, there will result what is popularly known as a warm wave, for the air will slowly and steadily flow from the southeast, where the pressure is greater, toward the northwest, where the pressure is less, and, receiving constant accretions of heat from the hot, radiating surface of the earth, without any cyclones to mix the upper and lower strata, will finally attain a temperature almost unbearable to animal life. This superheated condition of the lower stratum in which we live continues until the high over the ocean dies out or drifts away to the east and the low pressure area in the northwest begins to gyrate as a cyclone, moves eastward, mixing in its course strata of unequal temperatures and thus producing the cool and welcome thunder showers.

Twenty-five years ago mariners depended on their own weather lore to warn them of coming storms; then, although the number of ships plying the seas was much less than it is now, every severe storm that swept across them left death and destruction in its wake, and for days afterward the dead were cast up by the subsiding waters and the shores were lined with wreckage. Happily this is not now the case.

Cold Waves.—When the charts indicate the formation of a large mass of dense cold air in the northwest, as shown by the barometer readings, the skilled forecaster is on the alert. He calls for special observations every few hours from the stations within and directly in advance of the cold area, and as soon as he becomes convinced that the cold wave will sweep across the country with its attendant damage to property, destruction to animal life, and discomfort to humanity, the well-arranged system of disseminating warnings is brought into action and by telegraph, telephone, flags, bulletins, maps, and other agencies the people in every city, town, and hamlet, and even in farming settlements, are notified of the advancing cold 12, 24, or even 36 hours before it reaches them; and it is safe to say that $10,000,000 is a low estimate to make of the value of the perishable property that is protected in the United States as the result of the warnings that are distributed by the government in advance of the coming of only one of several severe cold waves that occur each winter.

In the late spring and early fall the highs or anticyclones, while possessing less energy than in the winter, may at times bring down to the earth such unseasonably cold air as to cause injurious or destructive frosts, the

frost being caused not necessarily by the cool air of the high, but by the clearness of the air, which allows a free escape of heat from the earth by radiation at night. As in the case of cold waves, warnings of frost are widely distributed, with great profit to the growers of tender fruits and vegetables.

The area and the intensity of cold waves depend upon the size of continents and their distance from the tropics. The interior of North America and of Siberia have geographic conditions that cause the most severe cold waves of any part of the world.

As stated before, the air has a downward movement in the anticyclone, which may be so feeble as to cause only a slight change in temperature at the earth, or it may be active enough to lower the temperature down to the frost line in spring or fall, or even have such energy as to cause a cold wave in winter.

Hurricanes—Most of the storms that gain such a velocity of gyration as to constitute hurricanes originate in the tropics and move northwestward to latitudes 26° to 32°, where they recurve and move toward the northeast. These are the most severe of all the storms that visit the North American continent. The West Indies and the Philippines are the regions wherein these forceful storms originate in the greatest numbers, and the commerce of all nations has profited largely by the spirit that has prompted the United States to establish, since 1898, a complete system of cable-reporting meteorological stations in both of these sections, which enables the central station to keep mariners advised of danger.

At times hurricanes remain several days in the Gulf of Mexico or off our south Atlantic coast, and the only indication we have of their proximity is a strong suction drawing the air briskly over some of our coast stations toward the center of the storm. Again, a heavy ocean swell may be caused by the friction of the rapidly gyrating air on the surface of the water, and when the hurricane has a slow progressive movement, as it usually has, south of latitude 30°, this swell may be propagated outward from the center of the storm faster than the storm is moving and reach the coast several hours before either the barometer or the wind movement gives any indication of the coming storm.

The tracks of the West Indian hurricanes are usually in the form of parabolas. These storms come from the southeast, but on reaching the latitude of our Gulf coast they, as a rule, recurve to the northeast and pass along our coastline or near to it.

West Indian hurricanes are cyclonic in character, but on account of the fact that the diameter of the whirling eddy is much less and the velocity of rotation much greater than in the average cyclone, it is customary to distinguish them as hurricanes. In other words, the hurricane is a cyclone of small area, but of powerful vortical action, and consequently of great destructive force.

Tornadoes.—It is not possible with our present knowledge of the mechanism of storms to forwarn the exact cities and towns that will be visited by tornadoes without alarming some towns that will wholly escape injury; but it is known that tornadoes are almost entirely confined to the southeast quadrant of the cyclone, and that when the thermal, hygrometric, and other conditions are favorable, the spot 300 to 500 miles southeast from the cyclone center is in the greatest danger.

It is desirable to make clear the difference between cyclones and tornadoes. The majority of the press, and many persons who should know better, use these terms as synonyms. A cyclone is a horizontally-revolving disk of air which may be 1,000 or 2,000 miles in diameter, with the air currents from all points flowing spirally inward toward the center; while a tornado is a revolving mass of air of only about 1,000 yards in diameter, and is simply an incident of the cyclone, nearly always occurring in its southeast quadrant. The cyclone may cause moderate or high winds through a vast expanse of territory, while the tornado, with a vortical motion almost unmeasurable, always leaves a trail of death and destruction in an area infinitesimal in comparison with the area covered by the cyclone.

Tornadoes mostly occur between 2 and 5 in the afternoon, and generally move from the southwest to the northeast; their tracks may vary in width from a few hundred feet to one mile; their velocity of translation is usually about that of an express train; their speed of gyration can be measured only approximately, but as it is sufficient often to drive straws a half inch into the bark of trees, it must equal or exceed the velocity of a rifle bullet.

General Principles of Forecasting: The forecaster, when each set of reports is received and charted, notes the position of each storm (cyclone), or cool area (anticyclone). By reference to previous charts he is able to determine the past development of these conditions, their speed and direction of movement, and by studying the distribution of air pressure over a broad area, such as that of the United States, he is able to mark out with a high degree of accuracy the future course and intensity of the two types of weather conditions—the cyclonic and the anticyclonic—the one giving warmer, unsettled, and probably foul weather, the other cool and stable conditions and usually clear weather.

METEORS: luminous bodies or appearances in the sky, or bodies entering the earth's atmosphere from regions of space; see AEROLITE. Of late, it is usual for astronomers and physicists to separate that class of M. known as 'shooting-stars' from the group of *meteorolites* or *meteorites*, on the ground that the most prominent appearances of the shooting stars are *periodic*, while the meteorites seem to occur at irregular intervals, and that the former have hitherto not been *proved* to leave any traces of their visit on the earth's surface. The *British Museum Guide* to the collection of fallen meteoric masses or meteorites, published 1881, divides them into three classes: (1) Aërosiderites or siderites, as consisting mainly of meteoric iron; (2) aërosiderolites or siderolites, conglomerates of iron and stone; (3) aërolites, almost wholly of stone (i. e., various minerals in crystalline condition, usually with a peculiar 'chondritic' or granular structure). It has lately been confidently asserted by one or two observers, that some chondritic meteorites show traces of organic remains—namely, of porous coral. Recent investigations have proved that new-fallen meteorites occlude six times their own bulk of gases, in the proportion of 46 per cent. hydrogen, 32 of carbonic oxide, and 18 of nitrogen. Some M. appear to be dissolved by heat in our atmosphere, and fall to earth in the form of meteoric dust. An attempt was made by Nordenskiöld 1880 to measure the quantity of meteoric dust that fell during a given time upon definite areas of snow along the Arctic Ocean. The amount that fell seems to be much more considerable than was previously imagined.

The star-shower on the night of 1833, Nov. 13, was the grandest ever observed. Another only less brilliant occurred 1866, Nov. 13; this had been confidently predicted, from the occurrence of similar showers at the corresponding date in 1799, 1833, and 1834. The shower commenced about 11:30 P.M., with the appearance at brief intervals of M. singly; then they came in twos and threes, steadily and rapidly increasing in number till 1h. 13m. A.M., Nov. 14, when no fewer than 57 appeared in one minute. From this time, the intensity of the shower diminished gradually, wholly ceasing about 4 A.M. The total number of M. which at that time came within the limits of the earth's atmosphere was estimated at about 240,000, and the number seen at each of the several observatories in Britain averaged nearly 6,000. This star-shower, like those of 1833 and 4, seemed to proceed from the region of the heavens marked by the stars ζ and γ in the constellation Leo; the point toward which the earth in her orbit was moving at the time. The M. on that occasion presented the usual variety of color, size, and duration; the great majority were white, with bluish or yellowish tinge; a considerable number were red and orange; a few were

blue; many surpassed the fixed stars in lustre, and some were even brighter than Venus (the most brilliant planet as seen from the earth) at her maximum. Most of the M. left trains of vivid green light 5°–15° in length, which marked their course through the heavens, and endured for 3″ on an average, then becoming dissipated; though some of the trains were almost 40° in length, and remained in sight for several minutes.

In Nov., 1899, another grand display of these M. was generally expected, but the shower failed to appear, for the reason, as subsequent calculations have proved, that the meteoric swarm was drawn aside, after the great spectacle of 1866–67, from its former path in space by the gravitation of Jupiter and Saturn. In consequence this path no longer intersects the orbit of the earth, and a great display of these particular M. may never be seen again. It is now agreed that the November M. move in an orbit round the sun, inclined at about 7° to that of the earth, and that, in all probability, this orbit forms a ring or belt of innumerable small fragments of matter, distributed with very variable density of grouping along it, thus corresponding so far to the Planetoid (q.v.) group between Mars and Jupiter. It is agreed also that the motion of this meteor ring round the sun is retrograde; that the earth's orbit at that point where she is situated on Nov. 13, 14, intersects this ring; and that, probably, in 1799, 1833–4, and 1866–7, it was the same group of M. which was observed; and the last-mentioned hypothesis has been made the foundation of a calculation of the orbit and periodic time of this meteor-ring. The fact that a November star-shower generally occurs two years in succession, and then recurs at an interval of 32 or 33 years, seems to indicate that though the earth may pass through the meteor-orbit every year, the meteors are so grouped at intervals along the ring, and their periodic time differs so much from that of the earth, that it requires 32–33 years before this accumulating difference amounts to a complete revolution of either the earth or the ring, and a repetition of the star-shower becomes possible.

Professor Newton of Yale Univ., who entered into an elaborate investigation of the subject, concluded that the 5 possible periodic times (the earth's being taken as unity) of the meteor-ring were $2 \pm \frac{1}{33^{\frac{1}{25}}}$, $1 \pm \frac{1}{33^{\frac{1}{25}}}$, and $\frac{1}{33^{\frac{1}{25}}}$, and that of these, the fourth, $1 - \frac{1}{33^{\frac{1}{25}}}$ or 354.62 days, was the actual period of its revolution round the sun, and that, consequently, it had described 34 revolutions while the earth had described 33, the cycle of 34 meteor revolutions differing from 33 years by only 3.17 days; and in accordance with this estimate, he calculated its orbit and the approximate extent (seeing the meteor shower generally occurs in two successive years) of the meteor-group which produces the November showers. But Prof. Adams (q.v.) and Alexander Herschel showed that the first four of the possible periods

given by Prof. Newton were *impossible,* and that the last $\frac{1}{33 \cdot 25}$ (i. e., that the meteor-ring makes $\frac{1}{33 \cdot 25}$ of a solar revolution in a year, and one complete revolution round the sun in 33.25 years), was the correct estimate. According to this view, the meteor-group must be so much extended along its ring or orbit as to take more than a year to cross the earth's orbit. A periodic time of 33¼ years, and an orbit which at the same time approaches so near the sun as to insect that of the earth, indicate a path of great ellipticity, akin to those of the comets; and the idea of the cometary nature of these M. derives support from two remarkable facts, the one discovered by Schiaparelli of Milan, that this assumed orbit coincides very nearly with that of the great comet of 1862 (Prof. Adams connects this comet with the August M.), and the other by C. F. W. Peters of Altona, that it coincides with that of Tempel's comet.

Another well-known meteor shower, which, however, exhibits certain irregularities, is that of the Andromedes, so-called because they appear to radiate from the constellation Andromeda. These also appear in November, and are apparently connected with Biela's comet which was dissipated between 1846 and 1872. A third shower, appearing annually on Aug. 10, radiates from the constellation Leo. There are, besides, many minor showers, occurring at various times of the year.

Alexander Herschel maintained that the M. are of recent origin, probably fragments from some of the great luminous bodies, and that though at present assembled in a comparatively dense group, the difference of their relative velocities will have the effect of gradually distributing them all over the meteoric ring, when a November shower will occur every year. Mr. Herschel also carefully observed 20 M. with the view of calculating their weight from the rate of their motion and the amount of heat (as shown by their brightness) evolved in the destruction of their velocity, by the resistance of the atmosphere, and found their weight to vary from 30 grains to 7½ lbs.

The cause of the luminosity of M. was long in dispute, the two chief suppositions being, that the resistance of the atmosphere to a body dashing through it at about 30 m. per second generated so much heat as to produce ignition; while the other was the action of terrestrial magnetism. The point most strongly urged against the first supposition, by the supporters of the second, was, that the height at which meteors were occasionally seen rendered any action of the atmosphere impossible; but as this objection was founded on the purely hypothetical opinion that the atmosphere did not extend more than about 50 m. from the earth's surface, it was not very cogent. This problem was handled by Sir John Herschel in an able paper in the *Edinburgh Review* (1848, Jan.), in which he clearly showed that the very high latent heat of the air in the higher and rarer parts of the atmosphere would be sufficient to

cause an enormous development of heat in the event of the air being compressed before a body advancing into it with a 'planetary' velocity. This opinion is now held by almost all eminent men of science. The enormous heat to which the meteor is thus subject produces incandescence, after which, with more or less facility, according to the nature of the materials of which the meteor is composed, the outer portion becomes liquid, and, by the powerful resistance of the air to the meteor's rapid course, is thrown off in a long stream, forming the tail, which, after rapidly losing its velocity, is precipitated to the earth as a fine dust like volcanic ash; while the meteor thus rapidly and constantly diminishing as it flies along in its headlong course, either becomes wholly dissipated into 'tail,' falls to the earth, or makes its way out beyond the limits of the earth's atmosphere, and continues its course. This supposition also gives a plausible explanation of the phenomenon of M. 'bursting,' this being caused by the sudden heating and consequent expansion of the outer part, while the interior is still in the state of intense cold acquired in interplanetary space.

Mr. Lockyer, experimenting with specimens of meteoric stone and iron, found that by varying the conditions of temperature he obtained spectra from meteorites which reproduced the most peculiar features of nearly every variety of spectrum presented by the celestial bodies. His conclusion is that 'all self-luminous bodies in the celestial spaces are composed of meteorites, or masses of meteoric vapor, produced by heat, brought about by condensation of meteor swarms, due to gravity.' Accordingly 'the existing distinction between stars, comets, and nebulæ rests on no physical basis;' they all are meteoric in origin, and the difference between them depends on differences in temperature, and on the closeness to each other of the meteorites composing them. New or temporary stars are produced by the clash of meteoric streams; and most variable stars are simply uncondensed meteoric streams. This theory is an interesting hypothesis not universally accepted by astronomers.

While astronomers and physicists in general have been thus trying to reduce the phenomena of M. to a system, their chemical brethren have not been idle. Public collections of meteoric bodies have been made at Vienna, the British Museum, Paris, Berlin; and private ones by Mr. Greg of Manchester, Baron Reichenbach in Austria, and Mr. Kunz, Prof. Shepard, and others in the United States; and opportunities have thus been afforded of determining the nature of their composition. About one-third of all the known chemical elements have been found in M., the vast majority of these bodies—about 10 to 1—belong to the group of iron M. In these iron forms about 90 per cent. of the mass, and nickel is almost invariably present.

METER, or METRE, n. *mē′tėr* [OF. *metre*, metre—from L. *metrum;* Gr. *metron*, a measure, a poetical measure: comp. Skr. *mâtram*, the instr. of measuring (see METE)]: in *poetry*, the quality of the measured sound which distinguishes poetry from prose, and whose harmony pleases the ear; the number of syllables in a verse, as of a psalm or hymn. METRICAL, a. *mĕt′rĭ-kăl*, pertaining to meter; having rhythm; consisting of verses. MET′RICALLY, ad. *-lĭ.—Meter* is that regulated succession of certain groups of syllables in which Poetry (q.v.) is usually written. A greater or less number of groups forms a *line* or *verse* (Lat. a turning), and in modern languages the verses usually rhyme with one another; though this is not at all essential to the notion of meter: see RHYME: BLANK VERSE. In the classic languages, meter depended on the way in which long and short syllables were made to succeed one another. English meter depends, not upon the distinction of long and short, but upon that of *accented* and *unaccented* syllables. Thus, in the lines,

The cur′ few tolls′ | the knell′ | of part′|ing day′—
War′riors and | chiefs′, should the | shaft′ or the | sword′—

the accents occur at regular intervals; and the groups of syllables thus formed constitute each a meter, or measure. The groups of long and short syllables composing the meters of classic verse were called *feet*, each foot having a distinctive name. The same names are sometimes applied to English measures, an accented syllable in English being held to be equivalent to a long syllable in Latin or Greek, and an unaccented syllable to a short.

Every meter in English contains one accented syllable, and either one or two unaccented syllables. As the accent may be on the first, second, or third syllable of the group, there thus arise five distinct measures, two dissyllabic and three trisyllabic, as seen in the words—1, fol′ly (corresponding to the classic Trochee); 2, recall′ (Iambus); 3, ter′ribly (Dactyl); 4, confu′sion (Amphibrachys); 5, absentee′ (Anapæst).

These measures are arranged in *lines* or *verses*, varying in length in different pieces and often in the same piece. The ending measure of a line is frequently incomplete, or has a supernumerary syllable; and sometimes one measure is substituted for another. All that is necessary is, that some one measure be so predominant as to give a character to the verse. Constant recurrence of the same measure produces monotony. The following lines exemplify the five measures:

1st Measure.

Rich′ the | treas′ure.
Bet′ter | six′ty | years′ of | Eu′rope | than′ a | cy′cle | of Ca|thay′.

2d Measure.

Aloft′ | in aw′|ful state′.
The prop′|er stud′y of | mankind′ | is man′.

3d Measure.

Bird′ of the | wil′derness.
War′riors and | chiefs′, should the | shaft′ or the | sword′.

4th Measure.

The dew′ of | the morn′ing.
O young′ Loch invar′ has | come out′ of | the west′.

5th Measure.

As they roar′ | on the shore′.
The Assyr′ian came down′ | like a wolf′ | on the fold′.

It is instinctively felt that some of these measures are better suited for particular subjects than others. Thus, the first has a brisk, abrupt, energetic character, agreeing well with lively and gay subjects, and also with the intense feeling of such pieces as *Scots wha ha'e*. The second is by far the most usual meter in English poetry; it occurs, in fact, most frequently in the ordinary prose-movement of the language. It is smooth, graceful, and stately; readily adapting itself to easy narrative and the expression of the gentler feelings, or to the treatment of severe and sublime subjects. The trisyllabic meters, owing to the number of unaccented syllables in them, are rapid in their movement, and calculated to express rushing, bounding, impetuous feelings. They are all less regular than the dissyllabic meters. One of them is frequently substituted for another, as in the opening of Byron's *Bride of Abydos:*

Know′ ye the | land′ where the | cy′press and | myr′tle
Are em′blems | of deeds′ that | are done′ in | their clime′;
Where the rage′ | of the vul′ture, the love′ | of the tur′tle—

where each of the three lines is in a different meter. In addition to this irregularity, one of the unaccented syllables is often wanting. For instance, in Mrs. Hemans's poem, *The Voice of Spring:*

I come′, | I come′! | ye have called′ | me long′;
I come′ | o'er the moun′tains with light′ | and song′—

the first line has only one measure of three syllables, although the general character of the versification is trisyllabic.

In a kind of verse introduced by Coleridge, and used occasionally by Byron and others, the unaccented syllables are altogether left out of account, and the versification is made to depend upon having a regular number of accents in the line:

There is′ not wind′ enough′ to twirl′
The one′ red leaf′, the last′ of its clan′,
That dan′ces as oft′en as dance′ it can′
On the top′most twig′ that looks up′ at the sky′.

Here there are four accents in each line, but the number of syllables varies from eight to eleven.

To *scan* a line or group of lines, is to divide it into the measures of which it is composed.

The variety of combinations of meters and rhymes that may be formed is endless; but a few of the more usual forms of English versification have received special names, and these we may briefly notice.

Octosyllabics are verses made up each of four measures of the second kind of meter, and therefore containing eight (*octo*) syllables:

> With fruit'|less la'|bor, Cla'|ra bound'
> And strove' | to stanch' | the gush'|ing wound'.

Scott's poems are mostly in octosyllabics, also *Hudibras*, and many other pieces.

Heroic is a term applied to verses containing *five* meters of the second kind, or ten syllables. Heroics either rhyme in couplets, or are without rhymes, constituting blank verse. Many of the chief narrative and didactic poems in the English language are in rhyming heroics; as those of Chaucer, Dryden, Pope, Cowper, etc. Milton's two great poems, Young's *Night Thoughts*, Thomson's *Seasons*, Cowper's *Task*, Wordsworth's *Excursion*, and many others, are in blank heroics. Metrical dramas are almost always in blank verse; in which case there is frequently a supernumerary syllable, or even two, at the end of the line:

> To be, | or not | to be, | that is | the ques|*tion:*
> Whether | 'tis no|bler in | the mind | to suf|*fer.*

In *Elegiacs*, the lines are of the same length and the same measure as in heroics; but the rhymes are alternate, and divide the poem into quatrains or stanzas of four lines, as in Gray's *Elegy*. The Spenserian stanza, popularized by Spenser in the *Fairy Queen*, and much used by Byron, differs from common heroics only in the arrangement of the rhymes, and in concluding with an Alexandrine (q.v.).

Service meter, also called *common meter*, is the form of versification adopted in the metrical Psalms, in many hymns, and other lyrical pieces. From being frequently employed in ballads, this meter is also called *ballad meter*. The first and third lines often rhyme, as well as the second and fourth.

Such are some of the more usual and definite forms of versification. In many poems, especially the more recent ones, so much license is assumed, that it is difficult to trace any regular recurrence or other law determining the changes of meter or the lengths of the lines; the poet seeks to suit the modulation at every turn to the varying sentiments. But it may be questioned whether much of this refinement of art is not thrown away, on ordinary readers at least, who, failing to perceive any special suitableness, are inclined to look upon those violent departures from accustomed regularity as caprice.

For the kind of verse called *Hexameter*, see that title.

METER, Electric. See Electrical Measuring Instruments.

METHANE, *měth'ān:* also called marsh gas and occasionally methyl hydride, has the formula CH_4. It is the simplest hydrocarbon, and all organic compounds are regarded as being derived from it by substituting various atoms or radicles for more or less of the hydrogen. Methane is found in swamps, being produced by the decay of vegetable matter. It is the chief constituent of the explosive 'fire damp' of the coal mines and is present to a large extent in natural and illuminating gases (see FUEL). Methane can be prepared by synthesis in a variety of ways; perhaps the two most interesting ones are the action of cold water on aluminium carbide, Al_4C_3, giving methane and aluminium hydroxide, and the treatment of heated copper with a mixture of hydrogen sulphide and carbon disulphide vapor, which results in the production of cuprous sulphide, $Cu_2.S$ and methane. Methane is also produced by the pyrogenic decomposition of many more complex hydrocarbons. Methane is a colorless, odorless gas; it liquefies at -82° C. under 55 atmospheric pressure and boils at -160° C. under ordinary pressure. The density of the liquid at -164° C. = 0.415; that of the gas at 0° C. and 760 mm. = 8. Methane is slightly soluble in water, more readily in alcohol, and burns with a faintly luminous flame. Its mixture with air or oxygen explodes violently on the application of a light. Electric sparks decompose methane into hydrogen and carbon, and chlorine replaces the hydrogen readily, forming methyl chloride, CH_2Cl_3, methylene chloride, CH_2Cl_2, chloroform, $CH\,Cl_3$ and carbon tetrachloride, $C\,Cl_4$, in quantities depending on the proportion of chlorine and on the conditions of the experiment.

METHEGLIN, n. *mĕ-thĕg'lĭn* [W. *meddyglyn*—from *medd,* mead; *llyn,* liquor, juice]: a beverage made of honey and water, fermented with yeast, and often spiced; mead.

METHENYL: hypothetical trivalent-radicle, $-\overset{|}{\underset{|}{C}}H$. It occurs in a large number of compounds, such as chloroform, $HCCl_3$; formic acid, $HC\lessdot^{O}_{OH}$, etc., and exhibits the same relation to methylene that this does to methyl, or that methyl itself bears to methane.

METHINKS, v. *mē-thĭngks'* [*me,* and *think*]: it seems to me; it appears to me. METHOUGHT, pt. *mē-thawt',* it did seem to me.

METHOD, n. *měth'ŏd* [F. *méthode*—from Gr. *methŏdŏs;* L. *methŏdus,* a proceeding in regular order, a mode —from Gr. *meta,* with, after; *hodos,* a way: It. *metodo*]: a suitable arrangement of things, proceedings, or ideas, to prevent confusion; a regular mode or manner of doing anything; orderly arrangement; system of arrangement peculiar to an individual; order; system; way;

manner. METHODIC, a. *mĕ-thŏd'ĭk*, or METHOD'ICAL, a. *-ĭ-kăl*, arranged or disposed with regularity; orderly; systematic; precise. METHOD'ICALLY, ad. *-kăl-lĭ*. METHODIZE, v. *mĕth'ō-dīz*, to dispose in due order; to reduce to method. METH'ODIZING, imp. METH'ODIZED, pp. *-dīzd*. METH'ODIZATION, n. *-dī-zā'shŭn*, reduction to method. METHODIST, n. *mĕth'ō-dĭst*, one of a sect of Christians founded by John Wesley—so called in 1729 from the regularity of their lives and the strictness of their rules; one who observes method. METH'ODISM, n. *-dĭzm*, doctrines and system of the Methodists. METH'ODIS'TIC, a. *-dĭs'tĭk*, or METH'ODIS'TICAL, a. *-dĭs'tĭ-kăl*, relating to method or the Methodists—in this last sense used contemptuously. METH'ODIS'TICALLY, ad. *-kăl-lĭ*.—SYN. of 'method': rule; regularity; course; mode; means; process; custom; fashion; habit; usage; plan; principle.

METHODIST BOOK CONCERN: the oldest important subordinate organization of the Methodist Episcopal Church, founded in 1789. This institution publishes a series of denominational weekly journals whose generic name is *Christian Advocate*, the oldest of which is *The Christian Advocate* in New York. It also publishes the *Methodist Review* (bi-monthly) and *The Epworth Herald* (weekly). It issues periodicals in various languages, books upon all subjects, and in fact does a general book business. There are also papers published in the interest of the churches by local associations, the best known of which are *Zion's Herald* of Boston, Mass., and the *Michigan Christian Advocate* of Detroit.

METH'ODIST CHURCH, FREE: organized 1860, at Pekin, N. Y., by persons who were or had been members of the Methodist Episcopal Church, and who believed the latter church to have fallen away from its original simplicity and spirituality. They declared that members had been received without sufficient evidence of repentance and conversion; that worldly practices and unlawful business were tolerated; that many professed Methodists no longer possessed the direct witness of the Spirit; that they no longer had power over all sin, and not only seldom attained even professedly entire sanctification, but were at variance among themselves in their preaching on this subject; that there was great neglect of discipline; that simplicity of dress had given place to fashion and extravagance; that pews had taken the place of free seats, and choirs had supplanted congregational singing; that sermons were no longer preached, but read; church buildings were erected at extravagant cost; that church fairs were held; and that oath-bound fellowship with irreligious men in secret societies was tolerated and encouraged. While all the articles of faith of the Methodist Episcopal Church are retained by the newer organization, two are added, emphasizing the doctrine of entire sanctification, and that of endless future rewards and punishment. The

profession of the exercise of a saving faith, the laying aside of all superfluous ornaments of dress, abstinence from intoxicating drinks and tobacco, and the promise not to join any society requiring an oath, affirmation, or promise of secrecy, are made conditions of membership in the Free Meth. Church, as is also attendance at class-meetings. The government is conferential; quadrennial, annual, quarterly, and district conferences being held, composed of lay and ministerial delegates in equal numbers. In place of bishops, general superintendents are elected every four years. The official board is retained. District chairmen take the place of presiding elders. Class-leaders are nominated by the preacher in charge, and elected by their classes. Congregational singing is practiced, and religious services have much of the primitive warmth and zeal. In 1905 the church had 1,000 churches, ministers 1,000, and over 28,038 communicants.

METH'ODIST EPIS'COPAL CHURCH: oldest and largest body of Methodists in the United States. Though not formerly organized until 1784, Dec., it originated in 1766 among some Irish immigrants who had settled in New York. For some months their religious fervor waned; but under the appeals of Barbara Heck they formed themselves into a class led by Philip Embury who, in the old country, had been a local preacher. About the same time Robert Strawbridge who had migrated to Md. and formed societies there, and soon afterwards the first circuit was established in Va. The society in the city of New York flourished, and in that city the first chapel in John street was dedicated. In the same year (1768) classes were formed on L. I., in N. J., Del., and Philadelphia. In that city the Methodists purchased from another religious body an unfinished church and completed it. This was the first Methodist church in that part of the country. Wesley hearing of the movement had sent out missionaries, the most noted of whom, Francis Asbury, arrived in 1771 and later was appointed by Wesley supt. of the American societies. The first American conference was held 1773, with 10 preachers, representing 1,160 members of societies. Nearly all the preachers, being of English descent, sympathized with England during the revolutionary war, and returned to the mother country. This was the case with the majority of the English clergy, thus leaving few ordained men to administer baptism and the Lord's Supper, and a movement to provide for this independently of them threatened a rupture of the peace of the church. In 1780 Wesley applied to the bishop of London to ordain one presbyter for the benefit of American Methodists, but was refused. In 1784 Wesley and two other presbyters ordained Thomas Coke, LL.D. as supt., and appointed Asbury as assistant, of the Methodist churches in America. Thereupon a general convention met in Baltimore, 1784, composed of 80 preach-

ers, at which the 'Sunday Service,' the 'Twenty-five Articles' of faith, and an episcopal form of government, with an elective episcopate, were adopted. Asbury was ordained, in due order, deacon, elder, and general supt. Thenceforward the growth of the church was rapid, while its organic structure was modified from time to time to meet exigencies, the plan of a delegated general conference being adopted 1808, and the first general conference held in 1812. Before the close of the 18th c., most of the characteristic features of the church had been clearly defined. Its territory had been divided into annual conferences; the foundations of its benevolent and educational enterprises had been laid: Sunday schools introduced; a publishing house established; and advanced ground taken on the subjects of temperance and slavery.

Doctrine.— The doctrine of the church is defined in the 25 articles, prepared, with the exception of the 23d, by John Wesley, from the 39 articles of the Church of England, with the intention that they should offer a broad basis upon which all evangelical Christians might unite. Its theology is broadly Arminian. Wesley's doctrine of 'assurance,' or 'the witness of the Spirit,' is firmly held, according to which the Holy Spirit 'works upon the soul by his immediate influence, and by a strong, though inexplicable, operation.' His doctrine of 'Christian perfection,' or 'sanctification,' also is very generally held. It is not meant to teach the attainment in this life of an absolute exemption from mistakes, infirmities, and temptations; but only that 'all saints may, by faith, be so filled with the love of God that all the powers of the soul shall be recovered from the abnormal, perverted, sinful condition, and, together with the outward conduct, be controlled in entire harmony with love.' The need of repentance and regeneration is emphasized; stress is laid on the doctrine of justification by faith alone; infant baptism is taught; and, for the rest, the orthodox faith professed by the leading evangelical denominations is held.

Government.— A series of 5 conferences administers the government of the church. The highest authority and sole legislative body is the 'General Conference,' which meets every 4 years. Prior to 1872, it, as well as the annual conferences, was composed of only ministerial delegates. In 1872 the lay element was admitted, and then the general conference consisted of 1 minister for every 45 members of each annual conference, chosen by the ministers, and 2 laymen, chosen by lay electors from the quarterly conferences within the territory of the annual conference. In 1900 the General Conference completed a previous action of the Annual Conference so that the number of lay and clerical delegates became equal, and at the same session, admitted the additional lay delegates who had been provisionally elected. Lay

and ministerial delegates are united as one body, though provision is made for their separate vote whenever one third of either element demands it. The body is presided over by the bishops. Besides being the court of final appeal, it elects bishops, missionary and educational secretaries, editors of its periodicals, and book agents. The 'Judicial Conference consists of 'triers of appeals,' of whom each annual conference elects 7. It tries bishops, when the triers of 5 annual conferences must unite; and appeals of members convicted in an annual conference, when those of 3 must unite. Its decisions are final, except that law questions may be reviewed by the general conference. The powers of the 'Annual Conferences' are merely administrative. A bishop presides if present, and they are composed of travelling preachers, who are responsible to them, and whose characters are examined each year. Their action is subject to review by the general conference. 'District Conferences' consist of the presiding elder, pastors, local preachers, exhorters, and one steward and Sunday-school superintendent from each charge in the district. The local preachers are licensed by and are responsible to them, being also recommended by them to the annual conferences for admission or ordination. This body also has the case of the general financial, educational, and benevolent interests of the district. The District Conference, however, is optional. The 'Quarterly Conference' is composed of the pastors, local preachers, exhorters, stewards, class-leaders, trustees, and Sunday-school superintendents of a single charge, over which it has supervision. The pastor, class leaders, and stewards of each charge constitute its leaders' and stewards' meeting, which cares for the sick and poor, superintends the discipline, and can recommend for membership and for license to preach or exhort. The membership of each charge is divided into classes, each having its own leader. Besides presiding over the general and annual conferences, the bishops arrange the districts of the presiding elders, ordain deacons, elders, and newly elected bishops, annually station the preachers, and have the general supervision of the temporal and spiritual affairs of the church. Though they are not diocesan, but have a joint jurisdiction over the entire church, since 1872 they have to reside severally within certain districts into which the territory is divided. The presiding eldership is a kind of sub-episcopate, with the duty of oversight and administration in a limited sphere. Their intimate acquaintance with pastors and people in their several districts, and their presidency over the quarterly conferences, enable the presiding elders to be useful counselors and assistants to the bishops, especially in making ministerial appointments. In this work, custom has made them the bishops' advisers, though they have no actual authority in the matter, the bishops alone be-

ing responsible for all appointments. Candidates for the ministry, after two years' probation in itinerant work, and a satisfactory examination in certain prescribed studies, may be admitted to a general conference and ordained deacons. After two years' further trial, they may be ordained elders. Before a candidate for the ministry can be received into full membership he is asked certain questions in the presence of the conference. Certain questions are answered in writing; one of these is: 'Will you wholly abstain from the use of tobacco?' Deacons administer baptism, solemnize marriage, assist elders in administering the Lord's Supper, and perform all the duties of a travelling preacher. Elders, besides all these, also administer the Lord's Supper. Except in this last prerogative, deacons, elders, and preachers have the same functions, and may have charge of a circuit or station. The pastor is the chief executive of the local church; has the care of its interests according to the requirements of the discipline; and is responsible to the annual conference for his ministerial fidelity and his moral character and conduct. Class-leaders are subpastors having special oversight of the various classes, with whom they have weekly devotional meetings; they act in subordination to the pastor. Local preachers are members of district and quarterly conferences, and are often useful adjuncts to the 'itinerancy' as a self-supporting body of lay ministers and evangelists. Admission to church-membership is granted after 6 months or more of satisfactory probation; members from other churches are admitted by certificate without probation. Each local society owns its church building, parsonage, etc., which are held by trustees lawfully constituted. A peculiarity in the constitution of the church, which it shares with most other Wesleyan churches, is the 'itinerant system' of limited pastorates. It was instituted by Wesley, and is still in vogue, though it has been considerably modified in recent years. At first, their being many more societies than preachers, Wesley divided the territory into 'circuits,' each comprising a certain number of societies, and appointed a preacher, or 'helper,' for each circuit. Preachers and circuits were changed at first semi-annually, then annually. All appointments are still made each year, but a pastor cannot be appointed to the same charge for more than five years in succession. This five year time limit was established by the general conference of 1888. From 1864 to 1888 the time limit was three years, and from 1804 to 1864 the limit had been two years. In 1900 the General Conference removed the limit making it possible for the bishops to appoint a minister annually to the same church to the close of his active ministry. In the work of evangelization the church has from the beginning been among the pioneers, everywhere keeping pace with the march of population, and usually being the first to appear in every

new field. Equally rapid have been its internal development and the establishment and growth of the various denominational institutions demanded by the times and circumstances. One of the first Sunday schools in the country was organized, 1786, by Bp. Asbury; and, 1790, its conference ordered such schools for the instruction of 'poor children, white and black, in learning and piety,' to be generally established. The Missionary and Bible Soc. of the M. E. Church in America was a result of the labors of John Stewart among the Wyandotte Indians of Ohio in 1816: it was organized in New York city 1819, Apr. 5, and incorporated by legislature of N. Y., 1839, Apr. 9. The following are the statistics of this society (1905): Members in foreign field, 240,765, a gain of 99½ per cent., 1891; Sunday school members, 270,021; value of churches and parsonages, $6,177,179; missionaries, 729; native ordained and unordained preachers, 3,519; local preachers, 1,871; collections for self-support, $186,787. The society also aided in the support of domestic missionaries in the U. S. The receipts of the society for 1820, its first year, were $823.04; in 1905, $1,582,215; annual average for 10 years—1896–1905—$1,336,118. The Woman's Foreign Missionary Society was organized in Boston, Mass., 1869, Mar. 23: approved by General Conference, 1872: incorporated, 1884, Dec. 27. The society has fields of work in China, Japan, Korea, Malaysia, Burma, India, Burgaria, Italy, Mexico, and S. America, and had, (1905) missionaries, 275½ societies, 5,996; members, 160,327; contributions, $470,702. The Woman's Home Missionary Society, whose field is in the U. S., was organized 1880, and had 1905: members, 87,063 and contributions, $428,-899. The Sunday School Union was formed in New York, 1827, Apr. 2; merged with the Bible Sunday Schol Union and Tract Society, 1833; reorganized by General Conference, 1840; incorporated by the legislature of N. Y., 1852, Feb. 4, and charter amended 1864, Apr. 11. The Sunday School Union had (1905) schools, 33,255; officers and teachers, 354,843; scholars, 2,873,172 (an increase of 10 per cent. since 1891); conversions, 150,-623; books and papers circulated in foreign field, 54,642,700 pages. The Tract Society was organized by General Conference, 1852. In (1905) this society printed 1,740,200 tracts, amounting to 12,561,000 pages. The Board of Church Extension was organized by General Conference 1864, May 27. Its report (1905) shows from the beginning $8,688,343, and churches aided, 14,305. The Freedman's Aid and Southern Education Society began its work among the refugees and freedmen during the Civil war. In 1905 this society maintained 45 schools with teachers, 614: students, 11,510. The society has expended $7,819,397 in its work and has property in schools aggregating $1,827,039. The Board of Education is the outcome of the observance of the

centennial year of the church in 1886 and was chartered 1869. Report for 1905 shows students assisted 1,959, about three-fourths of whom are preparing for ministerial and missionary work; total number aided from its beginning 14,025, to the amount of $1,452,314. The church maintains 14 orphan asylums and institutions for children, 10 homes for the aged, and 26 hospitals. The deaconess work of the church originated 1887, and there were (1905) 78 homes and institutions in America, Europe, Asia, and Africa, valued at $3,177,858; licensed deasonesses, 748. The National Associations of Local Preachers was organized in New York, 1858, Oct. 4, had (1905)) a membership of 300, and owns Taylor Univ., Upland, Ind. The educational institutions of the church are (1905) theological schools, 23; with instructors, 117; students, 1,244; value of grounds and buildings, $2,369,440; endowments, $2,225,627; debts, $16,000; colleges and universities 52; instructors, 2,340; students, 33,512; value of grounds and buildings, $15,266,079; endowments, $16,862,719; debt, $2,335,818; classical seminaries, 49; instructors, 504; students, 10,045; value of grounds and buildings, $3,035,303; endowments, $966,773; debt, $205,107; institutions exclusively for women, 9; instructors, 143; students, 1,457; value of grounds and buildings, $1,135,808; endowments, $661,708; debt, $35,000; foreign mission schools, 33; instructors, 383; students, 5,586; value of grounds and buildings, $1,101,800; endowments, $130,867; debt, $76,490; missionary institutions and Bible training schools, 4; instructors, 53; students, 640; value of grounds and buildings, $478,000; endowments, $10,000; normal university, 1; instructors, 62; students, 2,926; value of grounds and buildings, $125,000; endowment, $25,000. Total: Schools, 171; instructors, 3,602; students, 55,410; value of grounds and buildings, $23,511,935; endowments, $20,882,694; debt, $2,668,415. Schools duplicated in the above enumeration 22; instructors, 139; students, 1,496; value of grounds and buildings, $1,733,753; endowments, $1,070,657; debts, $14,000.

The Am. Univ. at Washington, D. C., incorporated 1893, is designed to afford the best and highest instruction in post-graduate and professional courses of study. The univ. buildings, of which some are nearly completed and others begun, occupy the site of Fort Gaines, comprising about 90 acres of ground on an eminence 4 m. from the capitol. The sickness and death of Bishop Hurst, the chancellor, checked its progress. It is, however, from year to year gaining in resources. The Rev. Franklin Hamilton is now (1908) the chancellor. The institution is not yet open for the reception of students.

The general conference of 1892 created a university senate and empowered it to determine the minimum

equivalent of academic work in the educational institutions of the church for graduation to the baccalaureate degree. The senate is composed of 15 educators appointed by the board of education, one from each General Conference district and one at large. It reports quadrennially to the board of education, and that board determines what institutions meet the requirements prescribed by the university senate. The institutions so adjudged can alone be officially recognized by the church as colleges or universities.

The church has publishing houses at New York and Cincinnati, with branches at Boston, Pittsburg, San Francisco, Detroit, Chicago, and St. Louis. Since 1844 the total sales have reached $76,785,907. The official statistics of the M. E. Church for 1905 are as follows: Conferences, 133; mission conferences, 11; missions, 18; bishops, 28; churches, 28,573, valued at $141,669,017; parsonages, 12,487, valued at $23,919,386; ministers, 18,661; local preachers, 13,935; lay members and probationers, 3,148,292: baptisms, children, 91,676; adults, 104,595; Sunday schools, 33,255; officers and teachers, 354,843; scholars, 2,873,172. The church gained in membership (1905) 381,636, or nearly 14 per cent.

The church has no prescribed ritual. Although it sets forth a ritual for use at discretion, the utmost liberty is allowed; so that, while in some churches there is an approach to liturgical forms, in the most there is great simplicity, with free prayer, congregational singing, and participation by the laity, male and female, in the devotional services.

On all moral questions the church has always taken advanced ground. It prohibits its members from 'buying, selling, or using intoxicating liquors as a beverage, signing petitions in favor of granting license for the sale of intoxicating liquors, becoming bondsmen for persons engaged in such traffic, renting property as a place in or on which to manufacture or sell intoxicating liquors, dancing, playing at games of chance, attending theatres, horse races, circuses, dancing parties, or patronizing dancing schools, or taking such other amusements as are obviously of misleading or questionable moral tendency.' In 1784, it declared slavery contrary to the law of God and to the principles of the American revolution, and measures were considered for 'eradicating this enormous evil from that part of the church of God to which we are united.' In 1808 slaveholders were declared ineligible to the office of elder: and, 1816, this ineligibility was extended to all officials. It was on this question of slavery that the division occurred which resulted in the organization of the Meth. Episc. Church, South (q.v.), 1845. During the late civil war the church was positive and outspoken in its official utterances in support of the union, and more than 100,000 of its members entered the Federal armies.

METH'ODIST EPIS'COPAL CHURCH, South. At the general conference of the Methodist Episcopal Church, 1844, two ministers, one of them a bishop, were suspended from office for being slaveholders. Thereupon 13 annual conferences remonstrated through their delegates, on the ground that such action must make the jurisdiction of the general conference over the conferences in the slaveholding states inconsistent with the success of the ministry there. A committee then drew up a plan for a peaceful division of the church. 1845, May 1, convention of the Southern conferences met at Louisville, Ky., and organized the Methodist Episcopal Church, South. It also provided for a meeting of the first general conference, which took place at Petersburg, Va., 1846, May. There the plan of division presented by the conference committee of 1844 was approved, and the property belonging to the whole church was equitably divided according to that plan and with the sanction of the United States supreme court. At its organization the church claimed a membership of about 459,000, of whom 124,961 were colored. The membership by 1860 had increased to 964,971, of whom 207,766 were colored. Through the war not only was its membership largely reduced, but its educational, publishing, and missionary interests were crippled and almost destroyed. In doctrine and polity it is very similar to the Methodist Episcopal Church, though a few changes have been made. Its general conference consists of an equal number of clerical and lay delegates. The annual conferences are composed of the itinerant preachers and 4 lay delegates, one of whom may be a local preacher, from each presiding elder's district. In 1872 the publishing house was burnt down but was soon rebuilt on a much larger scale.

The General Conference organized a General Missionary Board in 1846. The fields of labor are in China, Japan, Brazil, Mexico, and Korea; and reports for 1905-6 are as follows: Missionaries, 99; wives of missionaries, 83; native travelling preachers, 103; native local preachers, 117; members, 17,633; Sunday schools, 362; officers and teachers, 1,182; scholars, 16,533; Epworth leagues, 135; members, 4,939; schools, 62; pupils, 3,691; total value of missionary property, $994,131. The Indian mission had (1896) preachers, 138; local preachers, 186; white members, 15,405; Indian members, 4,111. The Woman's Foreign Missionary Society was organized 1878, May; has fields in China, Mexico, Brazil, also the Indian mission; with (1906) missionaries, 69; teachers, 257; boarding schools, 25; day schools, 56; hospitals, 2. The Board of Church Extension was organized 1882, besides which each annual conference has an auxiliary church extension board, and city boards of extension may be organized in cities that have three or more pastoral charges. The Womans' Home Mission

Society was formed to aid in building parsonages, and for general educational and religious work. The Board of Education has (1906) 203 schools of all grades under its care, with more than 1,612 teachers and 29,090 pupils, and property valued at $10,674,895, with endowments of $3,603,825.

The general statistics of this church for 1906 are as follows: Bishops, 12; travelling preachers, 7,038; local preachers, 4,800; members, 1,656,609—an increase of 9 per cent. over the past year, and the membership has trebled since 1866; Sunday schools, 14,892; teachers, 111,137; scholars, 1,084,238; Epworth leagues, 3,153; members, 141,840; membership of Junior leagues, 13,500.

The Colored Methodist Episcopal Church in America had (1907): Churches, 2,619; preachers, 2,673; members, 219,739.

METH'ODIST PROT'ESTANT CHURCH: organized 1830 by former members of the Methodist Episcopal Church, who for some time previously had expressed dissatisfaction with the government of the church, which they declared was too exclusively in the hands of the itinerant preachers, to the exclusion of other preachers and the lay membership. To effect a change in this respect they published *The Wesleyan Repository* 1820-24, and presented numerous petitions to the general conference 1828. After the meeting of the conference they resolved to publish another periodical, *The Mutual Rights,* for the discussion of the question at issue, and also organized themselves, in Baltimore, into a union society, with the recommendation that others be organized throughout the church, for the purpose of ascertaining how many members were in favor of a change in its government. Some of the agitators were thereupon expelled from the church, 11 ministers and 22 laymen in Baltimore being among the number. These at once organized, under Wesley's general rules, with the title of the 'Associated Methodist Reformers,' 1827, Nov. They petitioned the general conference 1828, for a change in the government, making it more representative, but were refused. Thereupon they withdrew from the church in large numbers in various parts of the country, and called another general convention of the reformers in Baltimore, 1828, Nov. 12, at which a provisional government was formed; and at the Baltimore convention 1830, Nov., a constitution and discipline for the government of the Methodist Protestant Church were adopted. The church agrees with the Methodist Episcopal Church in doctrine, but differs in government. Its general conference meets quadrennially, and consists of delegates elected by the annual conferences, one minister and one layman being chosen for every 1,000 members. As reported in 1907 the church had 1,551 ministers, 2,242 churches, and 183,894 communicants.

METH'ODISTS (British): name originally given, about 1729, by a student of Christ-Church to the brothers John and Charles Wesley, and several other young men of a serious turn of mind, then members of different colleges of Oxford, who used to assemble together on particular nights of the week chiefly for religious conference. The term was an allusion to the exact and *methodical* manner in which they performed the various engagements which a sense of Christian duty induced them to undertake, such as meeting together for the study of Scripture, visiting the poor, and prisoners in Oxford jail, at *regular* intervals. Subsequently, it came to be applied to the followers of Wesley and his coadjutors, when these had acquired the magnitude of a new sect; and though their founder himself wished that 'the very name,' to use his own words, 'might never be mentioned more, but be buried in eternal oblivion,' yet it has finally come to be accepted by most, if not all, of the various denominations that trace their origin mediately or immediately to the great religious movement commenced by John Wesley. For an account of the origin and earlier development of Methodism, see WESLEY, JOHN: WESLEY, CHARLES: WHITEFIELD, GEORGE. The present notice concerns its organization, doctrine, and present condition.

1. *Organization.*—This appears to have been partly improvised by Wesley to suit the exigencies of his position. It was not a theoretical and premeditated, but a practical and *extempore* system. In the *Rules of the Society of the People called Methodists*, drawn up by himself, he says: 'In the latter end of the year 1739, eight or ten persons came to me in London, who appeared to be deeply convinced of sin, and earnestly groaning for redemption. They desired (as did two or three more the next day) that I would spend some time with them in prayer, and advise them how to flee from the wrath to come, which they saw continually hanging over their heads. That we might have more time for this great work, I appointed a day when they might all come together, which from thenceforward they did every week—viz., on Thursday, in the evening.' This he calls 'the first Methodist Society.' Its numbers rapidly increased, and similar 'societies' were soon formed in different parts of England, where the evangelistic labors of the Wesleys had awakened in many minds 'a desire to flee from the wrath to come, and be saved from their sins'—the only condition, we may remark, required of any for admission into these societies. In order to ascertain more minutely how the work of salvation was progressing in individual cases, Wesley subdivided the societies into 'classes,' according to their respective places of abode, each class containing about a dozen persons, under the superintendence of a 'leader,' whose duties are partly religious and partly financial. 1. He has to see each person in his class once a week, 'to inquire how their souls prosper,' and to encourage, comfort, or cen-

sure, as the case may require. 2. To collect the voluntary contributions of his class, and pay them over to the 'stewards' of the society, and to give the ministers all necessary information regarding the spiritual or bodily condition of those under his leadership. For preaching purposes, on the other hand, the societies were aggregated—a certain number of them constituting what is called a circuit. This now generally includes a town, and a rural circle of 10 or 15 miles. To each circuit, two, three, or four ministers are appointed, one of whom is styled the 'superintendent;' and here they labor for at least one year, and not more than three. Every quarter, the classes are visited by the ministers, who make it a point to converse personally with every member; at the termination of which proceeding, a 'circuit-meeting' is held, composed of ministers, stewards, leaders of classes, lay preachers, etc. The stewards (who are taken from the societies) deliver their collections to a circuit-steward, and the financial business of the body is here publicly settled. At this quarterly meeting, candidates for the office of the ministry are proposed by the president, and the nomination is approved or rejected by the members. Still larger associations are the 'districts,' composed of 10 to 20 circuits, the ministers of which meet once a year, under the presidency of one of their number, for the following purposes: 1. To examine candidates for the ministry, and to 'try cases of immorality, heresy, insubordination, or inefficiency on the part of the clergy.' 2. To decide preliminary questions concerning the building of chapels. 3. To investigate and determine the claims of the poorer circuits to assistance from the general funds of the body. 4. To elect a representative to the committee of Conference, whose duty is to nominate ministers for the different stations for the ensuing year—their appointments, however, being subject to the revision of Conference. In all the financial and other purely *secular* business of the districts, laymen (such as circuit-stewards and others) deliberate and vote equally with the clergy. The supreme Methodist assembly is the 'Conference.' The first was held 1744, when John Wesley met his brother Charles, two or three other clergymen, and a few of the 'preachers'—men whom his zeal and fervor had induced to abandon their secular employments and devote themselves to declaring the message of the Gospel. The purpose for which he called them together was, he says, 'for the sake of conversing on the affairs of the "societies," . . . and the result of our consultations we set down to be the rule of our future practice.' In the course of his life, Wesley presided at 47 of these annual assemblies. The Conference now consists of 100 ministers, mostly seniors, who hold their office according to arrangements prescribed in a Deed of Declaration, executed by John Wesley himself, and enrolled in chancery. But the representatives previously mentioned, and all the ministers allowed by the

district committees to attend—who may or may not be members of the legal Conference—sit and vote usually as one body, the 100 confirming their decisions. In this assembly, which is exclusively clerical, every minister's character is subjected to renewed and strict scrutiny, and if any charge be proved against him, he is dealt with accordingly; candidates for the ministry are examined both publicly and privately, and set apart to their sacred office; the entire proceedings of the inferior courts (if we may so call them) are finally reviewed; and the condition, requirements, and prospects of the body are duly considered.

2. *Doctrine and Worship.*—Wesleyan M. claim to be *orthodox*, *Protestant*, and *evangelical*. The propriety of the last two appellations will probably not be disputed, but a rigid Calvinist might object to the first. They accept the *articles* of the English Church, but believing these articles to have been framed on a basis of *comprehension*, they consider themselves at liberty to accept them in an Arminian sense. It must not, however, be supposed that they are out-and-out Arminians. Their great distinguishing doctrine is the universality and freedom of the atonement; hence, they reject the Calvinistic doctrine of predestination and especially of reprobation (which they conceive incompatible with the universal atonement); but while they maintain the freedom of the will and the responsibility of man, they maintain also his total fall in Adam, and his utter inability to recover himself. If these two appear to the human understanding to conflict, it is nevertheless asserted that the Bible teaches both; and it is objected to high Calvinism, that, in its anxiety to be logical, it has shown itself unscriptural. Prominence is given by the Wesleyan M. to certain points of religion, some of which are not altogether peculiar to them. They insist on the necessity of men who profess to be Christians feeling a *personal interest* in the blessings of salvation—i.e., the assurance of forgiveness of sins and adoption into the family of God. This, however, is not to be confounded with a certainty of *final salvation*. They believe the Spirit of God gives no assurance to any man of that, but only of *present pardon*. In harmony with this view, they reject the doctrine of the necessary perseverance of the saints, and hold that it is fearfully possible to fall from a state of grace, and even to perish at last after having 'tasted of the heavenly gift,' and having been 'made partakers of the Holy Ghost.' They also maintain the perfectibility of Christians, or rather the possibility of their entire sanctification, as a privilege to be enjoyed in this life. But Wesley 'explains' that 'Christian perfection does not imply an exemption from ignorance or mistake, infirmities or temptations; but it implies the being so crucified with Christ as to be able to testify, "I live not, but Christ liveth in me."' He regards the sins of a 'perfect' Christian as 'involuntary transgressions,' and does not think they should be called 'sins' at all, though

he admits that they need the atoning blood of Christ. The Wesleyan Methodists in their religious services use more or less the English liturgy; the morning service being read in many of their chapels, and the sacramental offices being required in all. They observe a 'watch-night' on the eve of the New Year, on which occasion the religious services are protracted till midnight, and their chapels are generally crowded to excess; and in the beginning of the year they hold a 'covenant-service,' at which the congregations stand up (though this form is not invariable), and solemnly vow to serve the Lord. But even the ordinary religious services in some places are frequently marked by an ebullition of fervent feeling on the part of the audience, which has a very singular effect upon a stranger.

3. *History.*—The earlier history of Methodism was for many years the history of Christian effort to evangelize the neglected 'masses' of England. The noble labors of Wesley, and of those whom he inspired to imitate his example, met remarkable success. The reformation of life which his preaching produced, for example, among the Kingswood colliers and the Cornwall wreckers, is a testimony to the power of religion which cannot be too highly estimated. The zeal which has inpired the body in regard to foreign missions, although in the highest degree honorable, is only the logical development of their efforts at home—for they originally regarded their society in England as simply a vast 'home mission,' and neither Wesley nor his followers desired to consider themselves a 'sect,' a new church in the common usage of the term, but were warmly attached to the old national church, and considered themselves among her true children. When Wesley died (1791), his 'societies' had spread over the United Kingdom, the continent of Europe, the United States, and the West Indies, and numbered 80,000 members. Since then, they have largely increased, official statistics of 1906 showing 620,350 communicants in England and Wales. Other Methodist bodies in England and Wales comprised about 540,000 communicants. The number of adherents over the world is estimated at about 19,000,000.

The Wesleyan Methodists have three theological colleges for the training of ministers—one at Richmond Hill, Surrey, a second at Didsbury, s. Lancashire, and a third at Headingley, in Yorkshire, besides the establishments at Sheffield and Taunton; two schools for education of sons of Wesleyan ministers (New Kingswood School and Woodhouse Grove School); and two for the daughters, one at Clapton and another at Southport. The boys receive a six years' and the girls a four years' course of instruction. Attention is given also to elementary education, and their schools received 1879 a government grant of £96,700. The Methodist Book-room is in the City Road, London, and issues hun-

dreds of thousands of religious publications (tracts, etc.) monthly. The newspapers and other periodicals professedly in connection with the body include four quarterlies and about 150 journals in English and other languages. Among the more eminent Methodist authors may be named the two Wesleys, Fletcher, Benson, Clarke, Moore, Watson, Drew, Edmondson, Sutcliffe, Jackson, Teffry, Rule, Nichols, Smith, and Etheridge.

The corresponding denomination in the United States, one of the greatest of Protestant denominations, is the METHODIST EPISCOPAL CHURCH (q.v.). Also, see other 'METHODIST' denominations under their titles; also WESLEYAN METHODIST CONNECTION of America: AFRICAN METHODIST EPISCOPAL CHURCH: AFRICAN METHODIST EPISCOPAL ZION CHURCH.

Returning to the English Wesleyan Methodists, we notice the various secessions from the parent body in the order of time:

1. METHODIST NEW CONNECTION.—This society detached itself from the older one 1797. Its founder was Alexander Kilham (1762-98), who was received by Wesley into the regular itinerant ministry 1785. When, after Wesley's death, there was controversy whether the Wesleyans should continue their submission to the established church, Kilham urged that they should administer the sacraments as well as preach the word, and that they should separate entirely from the Church of England. Kilham urged also admission of the lay element to a share in government. The controversy grew acrimonious, and resulted in his expulsion from the society, and the formation of the New Connection. Its doctrines and order are the same as those of the old, the only difference being that it admits one layman to each minister into the Conference, and allows them to share in the transaction of all business, both secular and spiritual. These laymen are chosen either by the circuits or by 'guardian representatives' elected for life by the conference. In 1906 the numbers of the New Connection were: Members and probationers, 45,816; ministers, 205, and lay preachers, 1,238.

2. PRIMITIVE METHODISTS, vulgarly designated RANTERS, were first formed into a society 1810, though the founders had separated from the old society some years before. The immediate cause of this separation was a disagreement as to the propriety of camp-meetings for religious purposes; and also on the question of females being permitted to preach. A third point of difference is the admission to their conference of two lay delegates for every minister. In 1906, there were 199,241 communicants.

3. INDEPENDENT METHODISTS, who separated 1810; distinguished chiefly by their rejection of a paid ministry. They number 9,732 in England and Scotland.

4. BIBLE CHRISTIANS, called BRYANITES also, were

formed by a local preacher named Bryan, who seceded from the Wesleyans 1815. The only distinction between them and the original body appears to be that the Bible Christians receive the eucharistic elements in a sitting instead of kneeling posture. In 1906, their numbers were, members and probationers, 33,373; ministers, 210, and lay preachers, 1,528.

5. United Free Church Methodists have been recently formed by the amalgamation of two sects of nearly equal numerical strength. The older of these, the Wesleyan Association, originated 1834 in the removal of one or two influential ministers from the original connection. Points of difference subsequently appeared with regard to the constitution of the Conference. —The younger sect, the Wesleyan Reform Association, took its rise 1849, through the expulsion of several ministers from the parent body on a charge of insubordination, and being founded on the same principles as the last-mentioned community, arrangements were entered into for their union, which was subsequently effected. Church independency and freedom of representation in the annual assembly are two of the prominent distinctive traits in the organization of the *United Methodist Free Church.* Their united numbers in 1906 were, members and probationers, 101,820; ministers, 448, and preachers, 3,449.—The *Wesleyan Reform Union* consists of 8,700 members, who have not amalgamated with the Methodist Free Churches.

Welsh Calvinistic Methodists are not a secession from the followers of Wesley, but originated partly in the preaching of his friend and fellow-evangelist, Whitefield, and partly in that of Howel Harris, a Welsh clergyman of the Church of England. Whitefield was a Calvinist; Wesley was on some points decidedly Arminian. A difference arose between them on the subject of election, and thenceforward their paths lay in different directions. Whitefield, however, did not form a religious sect; and after his death (1769), his followers, being left without any distinct bond or organization, either followed the leading of the Countess of Huntingdon (q.v.), or became distributed among other denominations, a large portion, especially in Wales, becoming absorbed in the new society gradually forming itself through the preaching of Howel Harris and his coadjutors. They became a separate body 1810, and have now about 175,000 communicants. See Calvinistic Methodists.

The *Canadian Methodist Church* had (1901) 847,765 members and probationers.

Three of the above mentioned churches—the Methodist New Connection, the United Methodist Free Church, and the Bible Christians—have united under the name of United Methodist Church, and since 1907 have had a united conference as a governing body.

METHOMA'NIA. See Dipsomania.

METHOUGHT. See under METHINKS.

METHUEN, *mĕ-thū'ĕn*, PAUL SANFORD, Baron: English general: b. Corsham Court, Wiltshire, 1845, Sep. 1. He is descended from Sir Paul Methuen, who effected the treaty, named after him, between England and Portugal in 1703. He studied at Eton; entered the Scots Guards in 1864; saw special service on the Gold Coast in 1873; received a medal for bravery in the Ashanti campaign in 1874; became attaché in Berlin (1877), assistant quartermaster-general Home District (1881), and quartermaster-general in Egyptian war (1882); won a C. M. G. in Bechuanaland (1885); was in command of the Home District from 1892 to 1897; and commanded one of Buller's divisions in the unsuccessful attempt at the beginning of the South African war to relieve Kimberley. At Magersfontein he was terribly beaten. With Lord Roberts he marched on Pretoria in 1901, May. In 1902, Mar., he was captured between Vryburg and Lichtenburg, but immediately released. His South African record formed a strange contrast to his early military career.

METHUEN: Mass., town, in Essex county; on the Spicket river, and on the Boston & Maine railroad; about two miles north of Lawrence. It was settled in 1641, but was a part of Haverhill until 1725, when it became the town of Methuen. The government is administered, as in its early days, by town meetings. It has a number of manufacturing establishments, chief of which are cotton and woolen factories, bell foundry, organ factory, knitting mills, hat factory, worsted goods and yarn factories, and basket factories. It has good schools and the Nevins Memorial Library. Pop. (1900) 7,512; (1910) 11,448.

METHUEN TREATY: a commercial treaty between Great Britain and Portugal, signed in 1703 and annulled in 1835, having to do with the tariff on wines and wool. It was negotiated by Paul Methuen, the British ambassador to Portugal.

METHUSELAH, *mĕ-thū'sĕ-la* ('man with a dart?'): Hebrew patriarch. He is remarkable as the oldest man mentioned in the Bible, his age being stated in Gen. v. 27 as 969 years. According to Hebrew chronology, and to that of the Samaritan version (which, however, reduces his age to 720 years), he died in the year of the flood; but the Septuagint calculation makes him die six years earlier.

METHYL, n. *mĕth'ĭl* [Gr. *methu*, wine; *hulē*, material]: the hydrocarbon radical of methylic alcohol, being a colorless inflammable gas burning with a luminous flame. METHYLAMINE, n. *mĕ-thĭl'a-mĭn*, ammonia in which one atom of hydrogen is replaced by methyl (see METHYL, below). METHYLATED, a. *mĕth'ĭ-lāt-ĕd*, containing methyl. METHYLIC, a. *mĕ-thĭl'ĭk*, of or pertaining to methyl.

METHYL: hypothetical monovalent radicle (q.v.), CH_3. Some of the more important compounds in which

it occurs are methyl alcohol, CH_3OH; methylamine, CH_3NH_2; methyl chloride, CH_3Cl; methyl bromide, CH_3Br; methyl iodide, CH_3I; methyl ether, $(CH_3)_2O$; methyl benzene (toluene), $C_6H_5CH_3$; methyl sulphate, $(CH_3)_2SO_4$, and methane (methyl hydride), $CH_3H(CH_4)$. For further details vide the compounds cited.

METHYL ALCOHOL: sometimes called 'wood alcohol' or 'wood spirit,' H_3COH, can be prepared artificially, by synthesis, in a number of ways, but is usually manufactured by distilling wood. In combination with salicylic acid it forms the characteristic constituent of wintergreen oil. Methyl alcohol is a mobile liquid, with a spirituous odor and a burning taste. It boils at 66°—67° C.; at 20° its density = 0.796, and it mixes with water, ether, or alcohol in any proportion. The importance of methyl alcohol is not confined to its use in the laboratory as a solvent and for the preparation of more complex compounds; it is employed for similar purposes on a manufacturing scale, particularly in the making of dyes. Methyl alcohol is also used largely as a fuel and as a solvent in the production of varnishes. From the theoretical standpoint it is of great interest because it is the simplest alcohol.

METHYLAMINE: the simplest organic anologue of ammonia; has the formula H_2NCH_3. It occurs in *Mercurialis perennis* and *annua,* in bone-oil, and in the distillate from wood, and it may be synthesized in a variety of ways. Methylamine is a colorless gas, with an odor of ammonia. It boils at -6° C., and, unlike ammonia, will burn in air. Water, at 12° C., dissolves 1,150 volumes of the gas; the resulting solution exhibits all the general properties of ammonia water. Methylamine is largely used in the preparation of more complex organic compounds.

METH'YLATED SPIRIT: the common English name of a mixture of ordinary (ethyl) alcohol, with 10 per cent. of wood alcohol (impure methyl alcohol) and a small quantity of mineral naphtha. These materials are added to the ethyl alcohol in order to render it unfit for drinking. Methylated spirit is allowed to be sold duty free. For purposes of combustion it is as good as ordinary alcohol, but it is inferior to it for use as a solvent, except for such purposes as the manufacture of varnish or of transparent soap, or in the preparation of collodion; it cannot take the place of alcohol in the preparation of the finer chemicals.

METHYL BENZENE: the chemical name of toluene (q.v.).

METHYL BROMIDE: a colorless liquid, prepared by the action of phosphorus and bromine on methyl alcohol. It boils at 4.5° C., has sp. gr. 1.73 at 0° C., and is used for synthetical purposes in organic chemistry. Its formula is CH_3Br, and it is sometimes termed brommethane.

METHYL CHLORIDE: sometimes called chlormethane, CH_3Cl; is a colorless gas, with a sweet odor. It is prepared by heating a mixture of methyl alcohol (wood spirit) with sodium chloride and sulphuric acid. Methyl chloride is used in the manufacture of dyes and other chemicals and also for producing low temperatures. It boils at -24° C. Alcohol and water dissolve 35 and 4 volumes of methyl chloride respectively.

METH'YLENE: hypothetical bivalent radicle, $>CH_2$. It occurs in numerous organic compounds, such as formaldehyde, H_2CO; methylene chloride, H_2CCl_2; malonic acid, $H_2C(COOH)_2$, etc.

METHYL HYDROGEN SULPHATE: also called methyl acid sulphate, and, less correctly, methyl sulphuric acid, $O_2S<^{OCH_3}_{OH}$; is prepared by mixing methyl alcohol with concentrated sulphuric acid. It is a thick liquid, which cannot be distilled. It is an intermediate product in the formation of dimethyl ether, $(CH_3)_2O$, from methyl alcohol, and its chief importance is its relationship to those two compounds. Its isolation from the products of the reaction in question threw much light on the processes leading to the conversion of an alcohol into an ether, and this knowledge played a very important part in the development of organic chemistry.

METHYL HYDROGEN SULPHIDE: also called methyl mercaptan, or, more rarely and less correctly, methyl sulphhydrate; has the formula $HSCH_3$. It is the simplest thioalcohol, and bears the same relation to hydrogen sulphide, H_2S, that methyl alcohol, $HOCH_3$, bears to water, H_2O. Methyl hydrogen sulphide is prepared in a variety of ways, which are applicable to the production of other members of this series of compounds. The simplest plan is to treat potassium hydrogen sulphide, KSH, with methyl chloride, bromide or iodide (q.v.). Like the other thioalcohols, methyl hydrogen sulphide is a colorless liquid, with an extremely disagreeable odor resembling that of garlic; it boils at 6° C. In general, methyl hydrogen sulphide has properties similar to those of the alcohols (q.v.), but it forms crystalline compounds with a number of metals; of these the mercuric compound, $(H_3CS)_2Hg$, is the best known and will serve as an example. The alcohols only form such metallic derivations with the alkali metals. Methyl hydrogen sulphide is the starting point in the preparation of a considerable number of more complex organic compounds containing sulphur.

METHYL IODIDE: also called iodomethane, CH_3I; is a heavy, sweet smelling liquid, prepared by the action of phosphorus and iodine on methyl alcohol (wood spirit). It boils at 43° C., has sp. gr. 2.19 at 0° C., and is used for synthetic purposes in organic chemistry.

METHYL SULPHATE: a colorless, heavy liquid, prepared most simply by the action of methyl iodide (q.v.) on silver sulphate, Ag_2SO_4. Methyl sulphate has an odor of peppermint and boils at 188° C. Its formula is $O_2S(OCH_3)_2$, and it is largely employed for the introduction of the methyl group CH_3 into the molecules of organic compounds.

METHYL SULPHIDE: sometimes termed dimethyl sulphide or methyl thioether, $(CH_3)_2S$; is the sulphur analogue of dimethyl ether, $(CH_3)_2O$ (q.v.). It is prepared by the action of methyl iodide, CH_3I, on potassium sulphide, K_2S. Methyl sulphide is a colorless liquid, with a pleasant ethereal odor, but the smell of impure specimens is very unpleasant. It boils at 37.5° C.

METIC, n. *mĕt'ĭk* [Gr. *metoikos*, a settler, an alien—from *meta*, change; *oikos*, a house: L. *metœcus*, a stranger]: a sojourner; a resident stranger; an alien.

METIS, n. *mē'tĭs* [in *Gr.* and *L. myth.*, *Mētis*, the daughter of *Oĕĕănus*]: one of the asteroids or minor planets. See PLANETOIDS.

METOCHE, n. *mĕt'ō-kē* [Gr. *metoche*, I am a partaker of]: in *arch.*, the interval or space between two dentils.

METONIC, a. *mē-tŏn'ĭk* [from *Meton* (about B.C. 432), an Athenian, its discoverer]: epithet applied to the cycle of the moon. METONIC CYCLE or METONIC YEAR, a period of 19 years, at the end of which time the new moons fall on the same days of the year, and eclipses recur in nearly the same order. This arises from the fact that 19 solar years are nearly equal to 235 lunations, their average values being 6,939.68835 and 6,939.60249 days respectively.

METONYMY, n. *mĕt'ŏ-nĭm-ĭ* or *mĕt-ŏn'ĭ-mĭ* [L. *metonymĭă*—from Gr. *metōnum'ĭă*, a change of name—from *meta*, over, change; *onŏma*, a name: F. *métonymie*]: in *rhet.*, a figure of speech in which one word is substituted for another to which it has some relation—as a part for the whole, the effect for the cause, the abstract for the concrete—e.g., 'I have read Milton,' that is, his works; 'they have Moses and the prophets,' that is, their writings. This expressive figure is much used in proverbial and other pithy modes of speech. METONYMIC, a. *mĕt'ŏ-nĭm'ĭk*, or MET'ONYM'ICAL, a. *-ĭ-kăl*, used by way of metonymy; putting one word for another. MET'ONYM'ICALLY, ad. *-lĭ*.

METOPE, n. *mĕt'ŏ-pē* [Gr. *metŏpē*—from *meta*, with, between; *opē*, an opening]: in *arch.*, space, in the frieze of the Doric order, between the triglyphs—generally ornamented with figures, or bulls' heads, or pateræ.

METOPOSCOPY, n. *mĕt'ō-pŏs'kŏ-pĭ* [Gr. *metopon*, the forehead; *skopĕō*, I view]: the pretended art of discovering the character or disposition of individuals by the features or lines of the forehead.

METRA, *mĕt'ra:* ingenious pocket-instrument, invented about 1858; combining the thermometer, climometer, goniometer, anemometer, level, plummet, scales, etc., so that, by its assistance, travellers or engineers can determine the dip of rocks, angles of crystals, temperature, rate of wind; can take levels of large surfaces, determine latitude, and a variety of other matters connected with physical science; and can at once record their observations.

MÈTRE, n. *mā'tr,* or METER, n. *mē'tėr* [F. *mètre*]: French unit of length. The mètre is the basis of the 'metric' or modern French system of weights and measures. See METRIC SYSTEM; DECIMAL SYSTEM.

METRIA, n. *mē'trĭ-ă* [Gr. *mētra,* the womb]: childbed or puerperal fever. METRIC, a. *mē'trĭk,* of or belonging to the womb. METRITIS, n. *mē-trī'tĭs,* inflammation of the womb. METRALGIA, n. *mē-trăl'jĭ-ă* [Gr. *algos,* pain, grief], or METRODYNIA, n. *mē'trō-dĭn'ĭ-ă* [Gr. *odŭnē,* pain]: pain in the womb. METROPHLEBITIS, n. *mē'trō-flē-bī'tĭs* [Gr. *phleps,* a vein; *phlebos,* of a vein]: inflammation of the veins of the womb.

METRIC, a. *mĕt'rĭk* [F. *mètre,* a measure]: denoting measurement. METRIC SYSTEM, system of weights and measures first adopted in France, the two most important points in which are—1, that it is a decimal system; 2, that the units of length, superficies, solidity, and weight are correlated, two data only being employed: the *metre,* and the weight of a cube of water whose side is the 100th part of a metre (q.v.).

METRIC SYSTEM, THE INTERNATIONAL: in early times each locality and industry had its own system of weights and measures, which crudely served local needs and primitive conditions. With increasing intercourse between communities, this diversity of units and standards proved confusing and intolerable, and the demand for a simple universal system grew steadily to a climax in the closing years of the 18th century. The metric system of weights and measures was the fruit of decades of research, agitation, and indefatigable labor toward this end.

As early as 1670, Abbé Gabriel Mouton proposed as the unit for length an arc of one minute of the earth's circumference. Decimal subdivisions and multiples of this unit and an excellent Latin terminology were also suggested. Fifty years later, J. Cassini again suggested this unit. Christopher Wren, the English architect of Saint Paul's, urged as a unit the length of a pendulum beating half seconds. The length of a seconds-beating pendulum was proposed successively by Picard (1671), Huygens (1673), La Condamine (1747), and by Prieur, Miller, Jefferson, and Talleyrand in 1790. About 1783, James Watt, the inventor of the steam-engine, proposed a new decimal system with a simple inter-relation be-

tween the units of length, area, volume, and weight, a definite volume of water being taken as the unit of mass. In 1782, Gouverneur Morris, of Philadelphia, urged the use of the decimal ratio in the new monetary system. This was adopted and undoubtedly impressed the French with the great convenience of using the same universal system in daily trade which is used to express all abstract values. Influenced by the report of Morris, Thomas Jefferson, then secretary of state, on May 20, 1790, published a report outlining a decimal system of weights and measures.

Before the French National Assembly took the action in 1790 which culminated in the establishment of the metric system, the important elements and principles of a universal system of weights and measures had already been formulated: (1) The Arabic numerals with their decimal notation, already in use throughout Europe long before Roman numerals were discarded in English accounting; (2) the decimal ratio, whose origin antedates history, applied by the United States to its coinage upon recommendation of Gouverneur Morris; (3) a natural base for the unit of length urged by Christopher Wren; (4) an aliquot part of the earth's circumference suggested by Mouton; (5) a precise and scientific terminology formulated by the same illustrious Abbé; (6) a direct and simple inter-relation between the units of dimension and mass urged by James Watt; and finally (7) international co-operation suggested by La Condamine about the middle of the 18th century.

In 1790, new systems of weights and measures were introduced independently in the house of commons of England by John Miller, in the house of representatives of the United States by Thomas Jefferson, and in the national assembly of France by Prieur and Talleyrand. The noteworthy project of Prieur du Vernois was presented to the French assembly 1790, Feb. 9. The following month Talleyrand published a proposition concerning weights and measures which was later presented to the assembly, referred to the committee on agriculture and commerce, and considered by the assembly May 8. A decree, sanctioned by Louis XVI. on Aug. 22, 1790, approved the establishment of a new system, invited other nations to join in fixing the unit, and referred the whole subject to the French Academy for action. Representatives of Spain, Italy, Denmark, Netherlands, Switzerland and France actually participated in the consideration of the project. The academy commission, consisting of Borda, Lagrange, Laplace, Monge, and Condorcet, made a full report 1791, Mar. 19, which resulted in the decree of 1791, Mar. 26, sanctioning the choice of the earth's quadrant as the basis of the new system, the use of the units of dimension and mass. An arc of 10° on the meridian of Paris was measured with the utmost precision to deduce the length of the metre. The survey was

successfully completed by Delambre and Mechain in spite of extreme technical and political obstacles. Meantime, Lavoisier and Haüy, assisted by LeFevre-Gineau and Fabbroni, determined with the utmost care the weight of a definite volume of water as a basis for the new unit of mass. The nomenclature of the new system, based upon a report by the academy, 1793, Jan. 19, was fixed by law, 1795, Apr. 7, after 18 months of discussion.

In 1799, an international commission composed of representatives of ten independent nations was convened in Paris to deduce and establish the precise length of the proposed metre. The adoption of the report of this commission by the legislature 1799, June 22, marked the real birth of the metric system. Platinum standards of the metre and kilogram were adopted and formally deposited in the Palais des Archives at Paris. Copies of the standards were deposited at the Conservatoire des Arts et Métiers, the Observatory of Paris, and others were presented to several countries, including the United States. Thus was established the metric system, which within a century became the legal system of more than two-thirds of the civilized world. Founded upon the simplest principles and the fundamental modes of thought, the system presented such admirable features that it rapidly grew in favor among the intelligent classes in all countries. By the close of the 19th century more than 40 countries had adopted the system, and in scientific work its use had become world-wide.

The metric system was from its inception distinctly an international system, but in order that it should attain its fullest success, it was imperative that provision be made for international standards and their proper preservation as well as for national standards and their regular re-comparison with the fundamental standards of the system. Inspired by the great increase of international intercourse, the growth of science and industry, and the growing demands for precision and uniformity everywhere, the emperor of France, Napoleon III., by decree of 1869, Sep. 1, called an international conference to arrange among other things for the construction of new metric standards to meet the most rigorous demands of modern metrology. Twenty-four nations appointed delegates and the first session opened at Paris 1870, Aug. 8. Five meetings were held and important preliminary work inaugurated, but the session was unfortunately cut short by the Franco-Prussian war. At the second session, which was convened 1872, Sep. 24, thirty nations were represented and remained in session until Oct. 12.

After careful consideration, the commission passed forty resolutions to govern the construction of the new standards; 21 of these propositions referred to the metre, 12 to the kilogram, and two refer to their preservation and the guarantee of their invariability. The necessary scientific investigations were made by eleven special com-

mittees of savants. It was decided that all the standards should be constructed of an alloy of 90 per cent. platinum with 10 per cent. iridium, and a tolerance of two per cent. in excess or deficiency (resolution No. 6). This refractory alloy possesses extreme hardness, a fine grain, and withstands chemical action to a remarkable degree. The iridium-platinum alloy was adopted upon the suggestion of Henri Sainte Claire-Deville, who with his brother Charles and the physicist Stas of Belgium devoted the ensuing 10 years to attaining the requisite purity of the constituent materials, in their investigations opening up new chapters in the chemistry of the refractory alloys. The first ingot, weighing 525 pounds, known as the 'alloy of 1874,' failed to meet the high standard of purity set by the commission. Several standards, however, were constructed, one of which is deposited at Washington. A new alloy was prepared in the most careful manner by Messrs. Johnson, Matthey & Company, of London, and after repeated meltings the required homogeneity was attained. The purity was tested by the chemists of the international committee and of the French section and was found to exceed the requirements in this respect. Thirty-one prototype metres were made from this casting, and the copy corresponding to the true length of the metre of the archives was selected as the international standard of length and is designated by the letter **M.** The international prototype metre is an irido-platinum bar 102 centimetres in length of a cross section, 20 millimetres square, intermediate between the capitals H and X, and of such form that the surface bearing the graduations lies in the neutral plane of the bar. The lines used to define the metre were traced at the Conservatoire des Arts et Métiers. There are three lines engraved near each end of the bar. They are 6 to 8 microns wide and about a half millimetre apart, and the metre is defined as the distance between the middle lines of each group when the temperature of the bar is at 0° Centigrade. Thirty-nine prototype kilograms were constructed, the one most nearly corresponding to the kilogram of the archives being selected as the international standard of mass and designated by the letter **K.** On Sep. 26, 1889, the international prototypes were unanimously approved, adopted, and formally deposited in a special vault at the International Bureau of Weights and Measures, fastened by three locks, the keys of which were delivered, respectively, to the custodian of the archives of France, the president of the international committee, and the director of the bureau. The vault in which the prototypes are preserved is opened not oftener than once a year, these three officers being present.

The national prototypes of the metre and kilogram, furnished to the states signatory of the convention of the metre, were of the same material, form, and perfect construction as the international standards themselves.

Each contributory country received two copies of each international standard, to be used as a working standard and a reference standard, respectively. The standards were accompanied by attested certificates of comparison, two hard glass thermometers, each with a table of corrections referring to the international hydrogen scale, a piece of the alloy cut from the end of the metre bar for testing the coefficient of expansion, and each kilogram was accompanied by a rock crystal bed plate and other accessories requisite to the safe conveyance of the standard. Metre prototypes numbered 21 and 27 were allotted to the United States, having corrections at 0° Centigrade of + 2.5 microns and —1.6 microns, respectively, the probable error of the determination, based upon 784 individual comparisons, being below 0.2 microns. The kilogram prototypes allotted to the United States are numbered 4 and 20, with corrections of —0.075 and —0.039 milligrams, and volumes of 46.418 and 46.402 millilitres, respectively. These copies display a noteworthy precision of adjustment. The probable error of the determinations, based upon 1,092 individual weighings, is less than 0.002 milligrams. The copies of the metric standards sent to the United States were received by the president at the executive mansion 1890, Jan. 2, the seals broken in his presence, and a certificate authenticating the standards was signed by President Harrison. The standards were at once deposited in the office of standard weights and measures and are now in the custody of the United States bureau of standards, which was established 1901, July 1, by act of 1901, Mar. 3.

The International Bureau of Weights and Measures was established by the metric convention of 1875, May 20, signed at Paris by the plenipotentiaries of most of the civilized nations of the world, the United States being the first to sign. This bureau has the custody of the international standards of the metric system, to which all prototypes of the world are referred for verification, in terms of which the units of all systems are now stated. The bureau is maintained jointly by the contracting states. The international bureau is located at Sevres, a suburb of Paris, on neutral territory ceded by France for this purpose. The work of the bureau is supervised by an international committee of weights and measures, which is itself under the control of a general conference for weights and measures, composed of delegates of all the contracting governments. This conference meets at least once every six years to discuss and initiate measures necessary for the dissemination and improvement of the metric system, and to pass upon new fundamental metrological determinations.

THE METRIC SYSTEM.

The fundamental unit of the metric system is the 'METRE,' which is the unit of length. From this unit the units of mass (gram), and capacity (litre), were derived.

METRIC SYSTEM.

All other units are the decimal subdivisions or multiples of these. Furthermore these three units are simply related so that for practical purposes one cubic decimetre of water weighs one kilogram and contains one litre. The metric terms are formed by combining the words 'metre,' 'gram,' and 'litre' with the six numerical prefixes.

PREFIXES	MEANING	UNITS
milli-	= one thousandth or .001	
centi-	= one hundredth or .01	'metre' for length.
deci-	= one tenth or .1	
unit	= one . 1.	'gram' for weight.
deka-	= ten 10.	
hecto-	= one hundred 100.	'litre' for capacity.
kilo-	= one thousand 1000.	

The following tables are formed by inserting successively the names of the three units in the column headed 'unit' in the above outline table:

LENGTHS.

Ten milli-metres	=	One centi-metre.
" centi-metres	=	" deci-metre.
" deci-metres	=	" metre (about 40 inches).
" metres	=	" deka-metre.
" deka-metres	=	" hecto-metre.
" hecto-metres	=	" kilo-metre (about ⅝ mile).

The square and cubic units are the squares and cubes of the linear units.

WEIGHTS.

Ten milli-grams	=	One centi-gram.
" centi-grams	=	" deci-gram.
" deci-grams	=	" gram (about 15 grains).
" grams	=	" deka-gram.
" deka-grams	=	" hecto-gram.
" hecto-grams	=	" kilo-gram (about 2 pounds).

VOLUMES.

Ten milli-litres	=	One centi-litre.
" centi-litres	=	" deci-litre.
" deci-litres	=	" litre (about 1 quart).
" litres	=	" deka-litre.
" deka-litres	=	" hecto-litre (about a barrel).
" hecto-litres	=	" kilo-litre.

The ordinary unit of land area is the HECTARE (100 metres square), and is equal to 100 Ares. The hectare is about 2½ acres.

The metric ton is 1,000 kilograms.

EQUIVALENTS (NEARLY ACCURATE).

LENGTH.

	Inches.	Feet.	Yards.	Fath's.	Miles.
Milli-metre ...	0.03937	0.003	0.001	0.000	0.000
Centi-metre ...	0.39371	0.032	0.010	0.005	0.000
Deci-metre ...	3.93708	0.328	0.109	0.054	0.000
Metre	39.37079	3.280	1.093	0.546	0.000
Kilo-metre	39370.79000	3280.899	1093.633	546.816	0.621

CAPACITY.

	Cubic In.	Cu. Ft.	Dry Pts.	Gals.	Bus.
Milli-litre	0.06103	0.000	0.0018	0.000	0.000
Centi-litre	0.61027	0.000	0.0182	0.002	0.000
Deci-litre	6.10271	0.003	0.1816	0.022	0.003
Litre	61.02705	0.035	1.8162	0.227	0.028
Hecto-litre	6102.70515	3.531	181.6211	22.703	2.838

WEIGHT.

	Grains.	Troy Oz.	Avoir. Pound.
Gram	15.43235	0.032	0.002
Kilo-gram	15432.34880	32.150	2.204

SQUARE MEASURE.

	Square Feet.	Square Yards.	Acres.
Centiare	10.764299	1.196	0.000
Are	1076.429934	119.603	0.025
Hectare	107642.993419	11960.332	2.471

The United States has already adopted the metric system for many purposes. In 1866, congress legalized it for all purposes (Revised Statutes, sec. 3569); all the states have been provided with copies of the metric standards (joint resolution of congress, approved 1866, July 28); foreign postal rates are fixed in metric units (Revised Statutes, sec. 3880); the subsidiary silver coinage is based on specified metric weights (Revised Statutes, sec. 3513); and in 1894, Aug., congress adopted the international electrical units based on the metric system as 'the legal units of electrical measures in the United States' (Revised Statutes, Sup. Vol. II., ch. 131). By proclamation of 1899, the metric system was made obligatory in Porto Rico, and by act of 1901 was made the legal system of weights and measures in the Philippines. The most important actions, however, were the establishment in 1875 of the International Bureau of Weights and Measures by the United States and other leading countries of the world (United States Statutes at Large, Vol. XX., page 107), and the adoption of the metre and kilogram as the fundamental standards of the United States, from which the yard and pound are to be derived, 1893, Apr. 5.

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METRIST, n. *mē'trĭst:* a writer or composer of verses; a versifier.

METROGRAPH, n. *mĕt'rō-grăf* [Gr. *metron,* a measure; *grapho,* I write]: an apparatus on a railway-engine which indicates at any moment the speed per mile at which the train is travelling, and the time of arrival and departure at each station.

METROLOGY, n. *mē-trŏl'ŏ-jĭ* [Gr. *metron,* a measure; *logos,* discourse]: the science of weights and measures, or a treatise on them.

METRONOME, n. *mĕt′-rō-nōm* [Gr. *metron*, a measure; *nomos*, a law; *nŏmē*, division, partition]: small machine that measures and beats musical time, indicating the correct time or speed at which a musical composition should be played. Its invention, which in its rudiments is traceable as early as 1696, has been falsely ascribed to Mälzel 1815, inventor of the automaton trumpeter: see AUTOMATON. Mälzel only modified it. The test of a correct M. is, that when set at 60 it shall beat seconds. METRONOMY, n. *mė-trŏn′ŏ-mĭ*, the measurement of time by an instrument.

METROPOLIS, n. *mĕ-trŏp′ō-lĭs* [Gr. *mētrŏpŏlis*, a parent state, a chief city—from *mētēr*, a mother; *polis*, a city]: mother city; the chief city or capital of a kingdom or state; among *naturalists*, the district of greatest number, either of typical or of specific forms of plants and animals that exist within definite geographical limits. METROPOLITAN, n. *mĕt′rō-pŏl′ĭ-tăn*, in *church law*, the bishop of a *metropolis*, or 'mother city,' with its church, from which other churches have branched off, and on which other episcopal cities are in some sense dependent. The title did not come into use before the 4th c.; but the office or function can be traced to an earlier date. The Council of Nice, 325, recognized it as ancient. It is conjectured with some probability that the function, at least in its rudiments, was in existence at the middle of the 2d c. The attempt to trace it to the New Testament has not succeeded: it has discovered only that the apostles, gathering their early churches of converts, labored especially in great centres of population and influence, and were careful there to ordain 'elders' or 'bishops' (i.e., pastors). The natural inference that such pastors in such centres would be accepted as leaders by the surrounding and often daughter churches, and that their eminence would speedily lead to the conferring on them of functions essentially archiepiscopal and metropolitan, gives no basis for the supposition that the 'apostolic legates' Timothy and Titus were in any proper sense 'metropolitan archbishops,' with their suffragan bishops and provincial synods. (See Barrow, *Treatise on the Pope's Supremacy*, Suppos. v.) The jurisdiction of metropolitans, according to the ancient law of the church, was very considerable, and extended over all the bishops of that province of which the metropolitan see was capital. It was their privilege not only to summon and preside over provincial councils, to consecrate the provincial bishops, but also to decide certain causes, and in other ways to exercise authority within the sees of their suffragans. Recent canons have very much restricted their powers. The metropolitan is an archbishop, but distinguished from an ordinary archbishop by his having suffragan bishops subject to him, which is not necessarily the case of an archbishop.—In the Church of England, the Abps. of Canterbury and York are metropolitans, and in the Prot. Episc. Church of Ireland, those of Armagh and Dublin. In the newly constituted

hierarchy of the Rom. Cath. Church in England, the Abp. of Westminster has the rank of metropolitan. In the Rom. Cath. Church of Ireland, the Abps. of Armagh, Dublin, Cashel, and Tuam all possess the same rank. METROPOLITAN, a. having the rank of a metropolis, or pertaining to it; pertaining to the mother church. MĔ-TROPOLIT'ANATE, n. *-lĭt'ă-nāt*, the office or see of a metropolitan bishop. METROPOLITE, n. *mĕ-trŏp'ō-līt*, archbishop; bishop of the mother church. MET'ROPOLIT'I-CAL, a. *-lĭt'ĭ-kăl*, chief or principal as applied to cities; denoting archiepiscopal dignity or power.

METROP'OLIS LOCAL MANAGEMENT ACT: one of the special acts of the British parliament, regulating the metropolis of the United Kingdom for ædile and sanitary purposes; passed 1855. It created the Metropolitan Board of Works, with extensive powers of drainage, sewerage, lighting, cleaning, removing nuisances, and general improvements, and with powers also to rate the occupiers of houses for expenses of general management. Formerly, each vestry had done what it thought proper within its own parish.

METROPOLITAN MUSEUM OF ART: a museum in Central Park, New York, near Fifth Ave. and opposite 83d St. It is the outcome of a public meeting in the Academy of Music, 1869, when a committee was appointed to draft a plan for founding an institution for the culture of art. The state legislature granted this committee a charter 'for the purpose of establishing a museum and library of art; of encouraging and developing the study of the fine arts; of the application of art to manufactures and to practical life; of advancing the general knowledge of kindred subjects; and, to that end, of furnishing popular instruction and recreation.' The contribution of $1,000 to the funds of the museum confers the title of patron; of $500, that of fellow in perpetuity; and of $200, that of fellow for life. Contributions of works of art or of books to the value of twice this amount may be accepted in lieu of money. The first important acquisition was what is known as the Blodgett collection of pictures, consisting chiefly of examples of Flemish and Dutch masters. An archæological collection, consisting of more than 30,000 objects, gathered by Gen. di Cesnola, U. S. consul to Cyprus, during his explorations among the ruins of that island, was next added. These collections were temporarily housed and exhibited until the legislature authorized the Park dept. to erect a permanent building, which was formally opened by the President of the United States 1880. Among the objects of interest are Egyptian antiquities and ancient sculpture; sarcophagi and mummies; terra-cottas, inscriptions, and bronzes; glass, laces, and ancient pottery; mediæval ivories and casts of sculpture. The collection of paintings is large and extremely valuable. Miss Catharine Lorillard Wolfe bequeathed paintings valued at over $500,000. The *Friedland, 1807*, by Meissonier, representing Napoleon saluting his troops as they go into battle, cost $69,000, and Rosa Bonheur's *Horse Fair* cost $55,500.

Many masterpieces of the world are here preserved, among them the *Return of the Holy Family from Egypt*, by Rubens, and *Lions Chasing Deer*, by the same. Among recent contributions are a number of architectural models, the Parthenon, Notre Dame, etc., and several hundred mummy-wrappings of rare colors. The Di Cesnola collection comprises nearly 4,000 pieces of terra-cotta, consisting largely of vases; the glassware, about 1,700 pieces, is of both Phœnician and Greek workmanship; the gold and silver ornaments were found at Curium, besides many in Greek tombs. A notable feature of the museum is a memorial to Edgar Allan Poe, presented by the actors of New York. It consists of a statue of Poetry crowning with immortelles a bronze bust. The public are admitted to the museum free of charge during 4 days of the week—Wednesdays, Thursdays, Fridays, and Saturdays, also on holidays. On other days an admission fee of 25 cents is charged. Electric lights have been arranged so that the paintings, etc., can be viewed at night, and on Tuesday and Saturday evenings the building is open until 10 o'clock. Since 1891 the doors have been opened to the public on Sunday afternoons, also.

METSU, *mĕt'sü*, or METZU, *mĕt'zü*, GABRIEL: Dutch painter whose pictures are rare and valuable, and of whose life but little is known: b. Leyden (prob.) 1630; died after 1667. It is supposed that he was instructed by his father, who was an artist, and by Gerard Dow, and that about 1650 he removed to Amsterdam and became a pupil of Rembrandt. He attempted sacred subjects first, but later turned with great success to depicting scenes in the market and tavern, and the social life of the upper classes. Among the most famous of his pictures are the *Game-Dealer's Shop*, at Dresden; the *Ride of the Prince of Orange*, purchased by Baron Rothschild 1873 for £3,000; and the *Market-place of Amsterdam*, at the Louvre.

METTERNICH, *mĕt'tĕr-nĭch*, CLEMENS WENZESLAUS NEPOMUK LOTHAR, Prince von Metternich and Duke of Pontella: eminent Austrian diplomatist and statesman: 1773, May 15—1859, June 11; b. Coblenz; son of FRANZ GEORG KARL, Count von M., Austrian diplomatist, associate of Kaunitz. M. represented a very ancient and distinguished family, whose original seat was in Jülich. Young M. was educated at the Univ. of Strasburg, and afterward studied law at Mainz and travelled in England. In 1795 he married the grand-daughter and heiress of the celebrated minister Kaunitz, by whom he acquired large estates. His diplomatic career commenced at the congress of Rastadt, which he attended as representative of the Westphalian counts. His rise was very rapid; he added to the advantages of his birth and connections a more than ordinary diplomatic ability, with most graceful and winning manners. In 1801 he became Austrian ambassador at Dresden: and on the outbreak of the third coalition war, he negotiated the treaty of alliance between Austria, Prussia, and Russia. In 1806

he went as ambassador to Paris, and concluded 1807 the treaty of Fontainebleau, very favorable to the interests of Austria; but on the outbreak of the war between France and Austria 1809, he was detained some time ere he could obtain his passport. In that year he succeeded Count von Stadion as minister of foreign affairs (beginning his course as first minister of Austria 1809–48). concluded the treaty of peace with the French minister Champagny, and accompanied Empress Maria Louisa to Paris. He guided the course of Austria amid the difficulties of 1812–3. He maintained at first a temporizing policy and a scheme of an armed mediation of Austria; but the obstinacy of Napoleon reduced him to the necessity of adopting at last a decided step, and led him to resolve on a declaration of war by Austria against France, 1813, Aug.; and he subsequently conducted with great ability the negotiations which ended in the completion of the quadruple alliance. On the eve of the battle of Leipzig, the emperor of Austria bestowed on him the princely dignity. He was afterward employed in almost all the chief diplomatic affairs of that eventful time; and after the congress of Chatillon and negotiations with the Count d'Artois, he went to Paris, and signed the convention of Fontainebleau with Napoleon, went to England to negotiate concerning a new quadruple alliance, and attended the congress of Vienna, of which he was unanimously elected president. He signed, as Austrian plenipotentiary, the second peace of Paris, 1815, Nov. 20. After this, he continued still to conduct the diplomacy of Austria, and 1821 was appointed chancellor (*Haus-, Hof- und Staatskanzler*), and 1826 succeeded Count Zichy in the presidency of ministerial conferences on home affairs. His efforts were now earnestly directed to the maintenance of peace in Europe, and preservation of the existing state of things in the Austrian dominions by the strictest measures of police and severe despotism. The revolutionary movement of 1848 breaking forth with sudden violence, caused the aged minister to flee from Austria, and to seek refuge in England; nor did he return to Vienna till the end of 1851, when he received great marks of honor and favor from the emperor; but though sometimes consulted, he was never again asked to undertake the cares of office. He died at Vienna. During 1815–48, he was the leader of European conservatism, in which he showed the blindness of infatuation, indulging in puerile denunciations of reformers and liberals, opposing constitutional government, and procuring the establishment throughout Germany of a system of repression with which he thought to stifle discontent, but which instead forced it into more insidious and more violent activity. It has been said of him that he was political diplomatist and manager rather than statesman. It is pleasant to record that in private he was lovable, affectionate in his family, delightful in his friendships. The general opinion respecting M. has been well expressed by the (London) *Times*

newspaper: 'He was renowned rather than great, clever rather than wise, venerated more for his age than his power, admired, but not lamented.' The *Memoirs* of M., largely autobiographical, throw valuable light on his times. They appeared, edited by his son, 1879–82.

METTLE, n. *mĕt'l* [a metaphor taken from the *metal* of a blade, upon the temper of which its power depends]: natural ardor; spirit; sprightliness; courage; warmth of temperament; in *OE.*, substance. METTLED, a. *mĕt'ld*, high-spirited; ardent; brisk; full of fire. METTLESOME, a. *mĕt'l-sŭm*, high-spirited; brisk; full of mettle.

METTRAY, *mĕt-trā'* or *mā-trā'*, THE REFORMATORY OF: parent of all institutions intended to reform and restore to society, and not merely to punish, juvenile delinquents. Demetz, of the Parisian bar, struck with the evils and hardship attending the committal to prison of young, and, considering their training and habits, scarcely responsible criminals, there to languish hopelessly for a time, and then to emerge worse than when they entered, resolved, in conjunction with the Vicomte Bretignères de Courteilles, to found a school for reformation of this class of offenders. In 1839, accordingly, the Reformatory, or, as it is called, the *Colony of M.*, was established, about five m. from the city of Tours in France; and its operation gave proof that, by agricultural and other industry, and well-considered rules of organization and discipline, the neglected criminal may be trained to take his place honestly in society The children, wholly orphans, foundlings, and delinquents, in 1872 numbered 792. From the foundation till that date, 4,287 had been received. The relapses into crime of those who had left the colony amounted to only about 4 per cent. The success is due not solely to the excellent training and close supervision at M. itself, but to the care taken to preserve the link between the authorities and those who have left the colony. A small payment is made by the state for children sent under judicial sentence; the large extra expenditure necessarily incurred being defrayed from charitable contributions from individuals constituting the 'Paternal Society of Mettray.'

METZ, *mĕts*, F. *mās:* strongest fortress of the German imperial territory of Alsace-Lorraine, cap. of the dist. of Lorraine; before 1871, the main bulwark of France on her n.e. frontier, and cap. of the dept. of Moselle. It is on the Moselle, at its confluence with the Seille. The strength of M. consists in its exterior defenses, of which the principal are 11 forts, partly strengthened and improved since the German occupation, partly entirely new. The city contains many important institutions, barracks, hospital, military schools, and arsenals. The cathedral, Gothic, begun 1014, finished 1546, is remarkable for boldness, lightness, and elegance, and has a beautiful spire of open-work, 373 ft. in height. The industry is active;

there is trade in wine, brandy, indigo, glass; and there are several cloth manufactories in the neighborhood.

M., known to the Romans as *Divodurum*, was afterward called Mettis (corrupted from Mediomatrici, name of the people); hence the present form. Under the Franks, M. was cap. of Austrasia (q.v.). At the division of Charlemagne's empire, M., with the rest of Lorraine (q.v.), fell to Germany, and was afterward made a free city of the Empire. In 1552 it was treacherously taken by the French; and though Charles V. besieged the place from 1552, Oct.—1553, Jan., they kept it till it was formally ceded to them 1648. 1870, Aug., Bazaine was compelled to retire before the German army into M., with his forces; and after an investment of 70 days, during which no attempt was made to take the city by force (not even a single shell having been fired into it), Europe and the world heard the startling news of the capitulation of M., by which 180,000 men and immense military stores fell into German hands 1870, Oct. 27. By the treaty of Frankfurt, M. was annexed to Germany as part of Lorraine. Pop. (1869) 48,325; (1875) decreased by emigration into France, 37,925; or with garrison 45,856; (1881) 43,275; (1890) with garrison 59,723. Of the total civil pop. about half are Germans; of the total civil and milit. 17,000 are Protestants, 1,600 Jews; (1900) 55,462.

MEUDON, *mĕh-dōng':* town of France, dept. of Seine-et-Oise, 5 m. w. of Paris, on the Versailles and Paris railway. The *château*, approached by a fine avenue of four rows of lime-trees, was built by the side of an older château, the work of Philibert Delorme, by the Grand Dauphin, son of Louis XIV., 1699. During the Revolution, it was converted into a factory for warlike engines, and surrounded with a permanent camp, to keep out spies. The château, as it exists at present, was fitted up for Marie Louise by Napoleon 1812. It has a fine terrace, gardens beautifully laid out, and commands a very fine prospect. The Forêt de Meudon is a favorite holiday resort of the Parisians. Near it has been erected an expiatory chapel, dedicated to Notre Dame des Flammes, marking the scene of a terrible railway accident 1842, May, in which more than 100 persons were burned alive. Whiting is manufactured, and there are numerous bleach-fields. Rabelais was curé of M. for a long time. The château was for many years a favorite summer residence of Prince Napoleon.—Pop. 9,800.

MEULEBEKE, *mö'lĕh-bā-kĕh:* town of Belgium, province of W. Flanders, 20 m. s.w. of Ghent, on the Mandel, a tributary of the Lys. Weaving is carried on, and there are several breweries. It is near a railway, which connects it with Bruges and other places. Pop. 8,300.

MEUM and TUUM, *mē'ŭm, tū'ŭm* [L. *meum*, my or mine; *tuum*, thy or thine]: what is mine, and what is another's. *Note.*—Not knowing the difference between *meum* and *tuum* is politely saying the individual is a thief.

MEUNG, *mŭng* (or MEHUN, *mā-ŭng′*), JEAN DE: about 1279–1320; b. Meun, France: poet. He gained wide reputation by his scholarship; lived many years at the court of Philippe le Bel; and though author of many poems and sarcastic works, is best known by his attempt to complete the *Roman de la Rose*, left unfinished by Guillaume de Lorris. He wrote more than one-half of the work as it now exists.

MEURSIUS, *mē-ėr′sĭ-ŭs*, JOHANNES: 1579–1639, Sep. 20; b. Loosduinen, Holland: historian. He received a univ. education; became an accomplished philologist by study and travel; held the chairs of history (1610) and Greek in Leyden Univ.; and, leaving Holland on account of political disturbances, accepted a chair in the Acad. of Soröe, Denmark, where he died. He was esteemed one of the most learned men of his time; and besides many critical monographs on Greek and Roman literature, was author of a history of Denmark in Latin, and of *Glossarium Græco-barbarum* (1614) and *Athenæ Batavæ* (1625).

MEURTHE, *mėrt:* formerly a dept. in n.e. France, immediately s. of the former dept. of Moselle. The area was about 2,254 sq. m.; pop. (1866) 428,387. Its surface is undulating and picturesque; while along the e. border are the Vosges Mountains, rising in one point to 1,148 ft. The chief rivers are the Moselle and its affluents, the Meurthe, the Madon, the Seille, etc. This dist. is remarkable for beauty of scenery, fertility of soil, and variety of productions. After the treaty of Frankfurt, by which part of M. was ceded to Germany, the rest of M., with the small part of the dept. of Moselle that remained to France, was formed into a new dept. under the name MEURTHE-ET-MOSELLE; 2,015 sq.m.; pop. (1901) 484,722. Arrondissements: Nancy, Lunéville, Toul (from M.), and Briey (from Moselle); cap. Nancy.

MEUSE, *mėz:* river in n. Europe, rising in the dept. of Haute-Marne, France, and flowing n. through the depts. of Vosges, Meuse, and Ardennes. It traverses the mountainous 'forest of Ardennes,' and enters Belgium at Namur, where it is joined by the Sambre from the w.; thence running n.e. past Liége, it receives the Ourthe; forms part of the boundary between Belgium and Holland; passes Maestricht and Roermund, and is joined by the Roer. Below Gorkum it separates into two branches, each of which afterward also divides into two, the whole finally discharging through these channels into the North sea. Their delta, forming shoals and quicksands, is larger than that of any other river in Europe. It passes, besides the cities mentioned, Verdun, Sedan, Mézières, and Charlemont, in France; and Venloo, Dort, and Rotterdam, in Holland. It is about 580 m. long, and navigable about 45 m. from its mouth.

MEUSE, *mėz:* frontier dept. in n.e. France: 2,400 sq. m.; pop. (1901) 283,480. The surface is traversed s.e. to n. w. by two parallel ranges of hills, which from the

right and left bank of the river Meuse (see MAAS), and separate it from the basin of the Seine on the w., and from that of the Moselle on the e. The Meuse, the Ornain, and the Aire are the chief rivers. The soil is generally poor, except in the valleys of the principal rivers, which are remarkably fertile and well cultivated. The usual crops are raised. Twenty-two million gallons of wine (red and white) are made annually. The four arrondissements are Bar-le-Duc, Commercy, Montmédy, and Verdun; cap. Bar-le-Duc.

MEUSE, a. *mūz*, as in *Meuse* Lane: a Scotch spelling of MEWS, *which see under* MEW 2.

MEW, v. *mū* [F. *miauler;* Ger. *miauen*, to cry as a cat: an imitative word]: to cry as a cat: N. the cry of a cat. MEW'ING, imp. MEWED, pp. *mūd.* MEWL, v. *mūl*, to cry as a child from uneasiness; to squall. MEWL'ING, imp.: ADJ. crying or screaming as a child. MEWLED, pp. *mūld.* MEWL'ER, n. *-ėr*, one that mewls.

MEW, v. *mū* [F. *muer*, to moult, to mew—from L. *mutārĕ*, to alter, to change: Low Ger. *muten*, to moult: Norw. *muta*, to lurk or seek covert, as a bird moulting (see MOULT)]: to shut up; to confine; to inclose; to shed the feathers; to moult: N. a cage for hawks; in *OE.*, an inclosure; any place of confinement. MEW'ING, imp.: N. act of moulting. MEWED, pp. *mūd.* MEWS, n. plu. *mūz*, the royal stables in London, so called from having been the place where the hawks were kept; any range of buildings occupied as stables.

MEW, n. *mū*, or SEA-MEW [AS. *mæw;* Dut. *meeuw*, a gull or sea-swallow: an imitative word]: English term for the common European gull (q.v.) and various small gulls.

MEXICAL, a. *měks'ĭ-kăl* [from *Mexico*]: denoting an ardent spirit or brandy distilled from agave-wine.

MEXICAN WAR, THE: the annexation of Texas in 1845 laid the foundation for the war with Mexico. Although Texas had been practically free for many years, and had been recognized by the United States, England, France, and other countries, yet Mexico still refused to acknowledge its independence. When, therefore, the United States proposed to admit Texas into the Union, Mexico gave warning that the annexation would be equivalent to a declaration of war, and 1845, Mar. 6, protested, and soon afterward withdrew her minister and severed diplomatic relations. Her acts, however, scarcely justified her threats, as at that time at least little or no preparation was made for war. It has, therefore, been claimed that had the American government used a conciliatory policy peace might have been preserved, and friendly relations re-established.

At the moment, however, the Mexican people and authorities were in a rather belligerent attitude, due in part to pride, and in part to an expectation that the

United States would soon be involved in a war with Great Britain over the Oregon boundary, in which case Mexico would have a powerful ally to aid her. Did President Polk at this point seek to strengthen this hope in the minds of the Mexicans, intending at the proper moment to make a compromise and peace with England, as was done, and thus leave Mexico at the mercy of the United States? Perhaps history can never answer the question, but events at least seemed to march in harmony with the thought. For Mexico soon found herself in the dilemma that she must either sell California to the United States, receiving in return a goodly sum of money to appease her pride, or engage in a war to sustain her honor and territorial integrity. Mexico bravely, but perhaps not wisely, chose the latter alternative, not fully realizing the inequality of the contestants, nor the depth of the humiliation to which she would be subjected. Doubtless President Polk preferred to acquire California without war; but its acquisition was to be the principal measure of his administration. Hence if war was the only means to secure it, war it must be; at least enough to get possession of the desired territory, then he would be glad to return to a peace policy.

Causes of the War.—The immediate occasion, however, of the war was the dispute in regard to the western boundary of Texas. Proclaiming her independence in 1836, Texas asserted that her western boundary was the Rio Grande to its source, thence due north to the 42d degree of north latitude. The following year the United States recognized her independence, and in 1845, Dec., by a joint resolution, admitted her into the Union as a state, providing that boundary disputes were to be settled by the United States. President Polk accepted the boundary line claimed by Texas, and 1846, Jan. 13, ordered Gen. Zachary Taylor to march to the eastern bank of the Rio Grande as the western boundary of the United States. Mexico insisted that the Nueces river—100 miles eastward—was the true western boundary of Texas, and therefore that General Taylor was now on Mexican soil. On Apr. 25, 1846, the first blood was shed in a conflict between a band of Mexican troops that had crossed to the eastern side of the Rio Grande and a company of American soldiers. The news of this action was immediately communicated by General Taylor to President Polk, who sent his now noted message to congress, asserting that war was begun by the act of Mexico on American soil. Congress accepted, after a stormy debate in the senate, the president's statement, and war was recognized as existing.

Other causes than the two already noted were also at work, and helped to make a decision in regard to the justness of the war still more difficult. Mexico for many years had been in a chronic state of revolution. The natural result followed. American citizens in Mexico

sustained property losses, and doubtless were frequently unjustly arrested and even imprisoned. Claims arising from these causes had been in part settled under a convention of 1840, but many of them were still pending. Some were just; more, either unjust or extravagant in amount. President Polk united these unsettled claims with the boundary question, and demanded that Mexico receive an envoy extraordinary with power to settle both —on its face an eminently fair proposition. On the other hand, Mexico professed to be ready to receive an ambassador to settle the boundary dispute, but declined to receive Mr. Slidell as our minister when commissioned to settle all disputes, insisting that the two questions were distinct in kind and origin and should not be united. President Polk in his message asserted that this action of Mexico was in violation of her promise to receive a minister, and hence justified his administration in its measures, and forced him to take possession of the disputed territory.

The need of more slave territory was perhaps another factor in causing the war. At least many from the South took an aggressive position on all questions in dispute between the two countries and thus made a peaceable settlement more difficult. Both the economic and the political reasons for more territory began to be felt by 1846—the one to have new soil over which to spread the land-exhausting system of slavery; and the other to have new territory out of which to carve new slave states, that the equilibrium between slave and free states might be maintained. Some other forces tending to arouse the war and aggressive spirit may be noted. The cry of 'manifest destiny' played a part. Many, especially in the West, felt that the Pacific Ocean was the natural western boundary of the United States. They also demanded the 'Golden Gate' that commerce might be opened up with the Orient. The two great parties—the Whigs and the Democrats—divided quite sharply on the question; in fact, so completely that the war became almost a party, instead of a national, war. The Democrats as a rule supported the administration and its claim that the war was just. The Whigs, on the contrary, asserted that it was a most unholy and unrighteous war, and characterized it as Polk's war. Lincoln, entering congress in 1847, became a severe critic of the policy pursued.

President Polk summarized his reasons for recommending that congress recognize war as existing as follows: 'The grievous wrongs perpetrated by Mexico upon our citizens throughout a long period of years remain unredressed; and solemn treaties . . . have been disregarded. . . . Our commerce with Mexico has been almost annihilated.' He then adds: 'As war exists, and . . . exists by the act of Mexico herself, we are called upon by every consideration of duty and patriotism to

vindicate with decision the honor, the rights, and the interests of our country.'

The Campaigns.—The war with Mexico was accepted as a fact by congress 1846, May 13. There were four principal fields of action in its prosecution. (1) Along the Rio Grande, under the command of Gen. Zachary Taylor; (2) in California, where Capt. John C. Frémont and Admiral Stockton were in command; (3) in New Mexico, with Gen. Stephen W. Kearney leading the American forces; and (4) from Vera Cruz to the City of Mexico, under the command of Gen. Winfield Scott, the commander-in-chief of the American armies. Everywhere success attended the American arms. Perhaps it was the first war in history, lasting two years, in which no defeat was sustained by one party, and no victory won by the other.

General Taylor defeated the Mexican troops at Palo Alto May 8; at Resaca de la Palma the following day and captured Matamoras on the 18th. He remained near that city for some weeks to recruit his army and prepare to advance into the interior. On Sep. 24 he entered Monterey, after a siege of four days, and a gallant resistance by the Mexicans. Taylor's most famous victory, however, was won 1847, Feb. 23, at Buena Vista. General Scott gave orders, which unfortunately fell into the hands of Santa Anna, the Mexican general, for General Taylor to send some nine regiments to aid Scott in his proposed attack on Vera Cruz. Santa Anna immediately marched his whole command against Taylor, expecting to crush him in this weakened condition. It was 20,000 men against about 5,000. But the skill of Taylor, the persistence of his army, the organization and equipment of the American troops, won a great victory. Taylor became the hero of the hour, and Buena Vista made him an irresistible presidential candidate.

Frémont's course in California has been a subject of keen controversy. As leader of an exploring expedition he was already in northern California, and early in 1846 was recalled to the Sacramento valley. California was the goal of the political policy of Polk's administration. The means to secure its acquisition were uncertain. It might be gained by war; or by filling the territory with American settlers who in course of time might bring it into the Union as Texas had already been annexed; or it might be effected by securing the good-will of the native Californians who were already jealous of Mexican rule. The latter policy seems to have been the one adopted by the administration. The American consul at Monterey, Mr. Larkin, was developing this policy with a good prospect of success, it is claimed, when Frémont appeared on the scene. He seems to have developed a fourth policy, namely, the establishment of an independent government under the control of the American settlers in the Sacramento valley. This movement resulted

GENERAL SCOTT ENTERING THE CITY OF MEXICO.

in the 'Bear Flag Republic,' and virtual civil war between the native Californians and the American settlers. At this moment the Mexican war began and the 'Bear Flag' was replaced by the 'Stars and Stripes.' It has been claimed by some California historians that Frémont's course, had not the Mexican war come at the moment it did, might have lost California to the United States. The native Californians, alienated as they were by his course, might have put themselves under an English protectorate in revenge for the treatment accorded them. Be this as it may, by the end of the year all California was conquered and held by American troops, and Frémont was regarded as the hero who had won the 'Golden Gate' by his energy and decision. Santa Fé was captured by General Kearney, and New Mexico secured with almost no loss of life. By the end of the year, therefore, all the territory that the administration desired was in the possession of its armies, but Mexico was still unconquered.

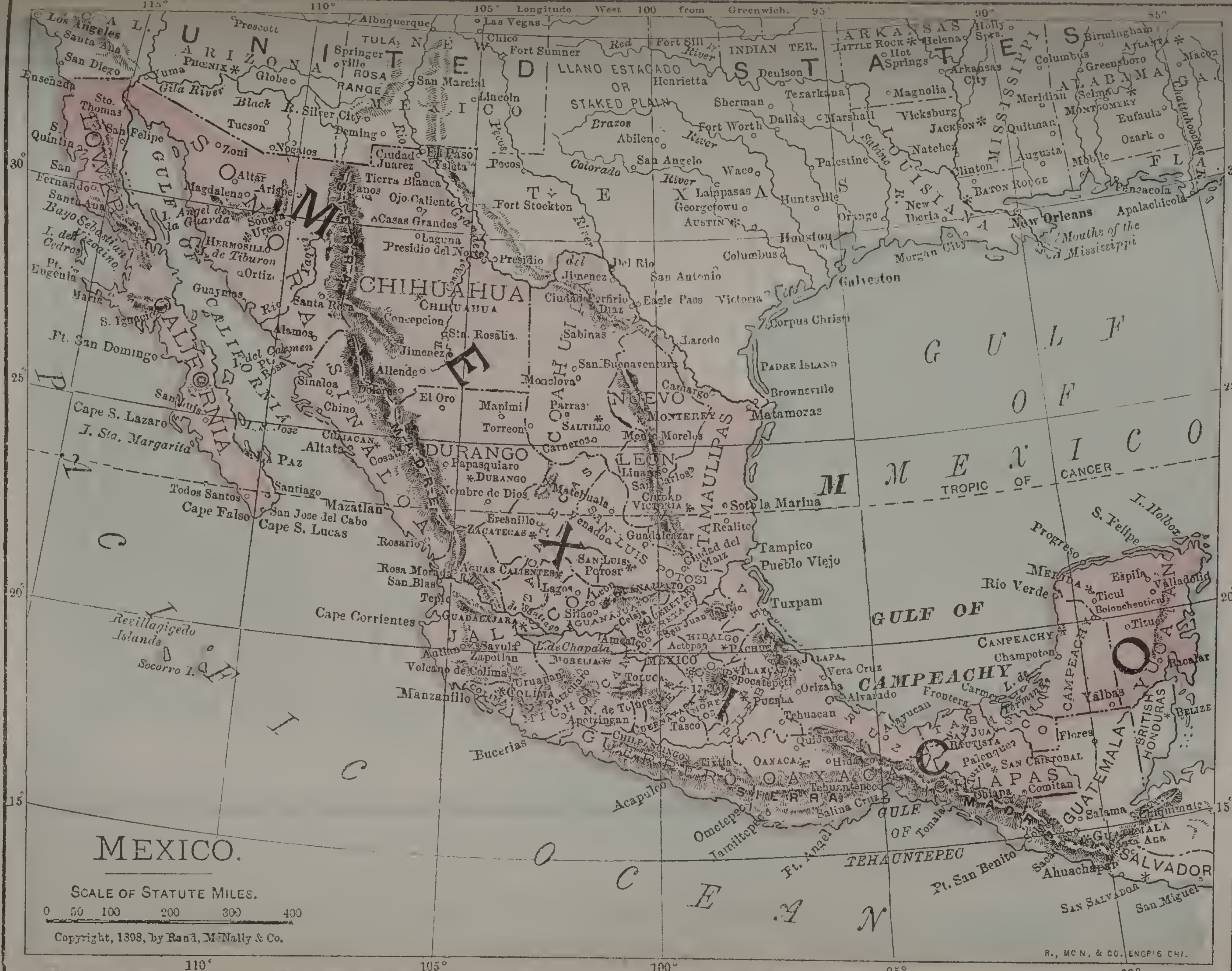
Scott had been chafing in Washington during the summer and fall of 1846 while Taylor was winning his brilliant victories. He asked to go to the front to assume chief command, but the administration retained him at the capital under the plea of needing his advice. As it happened this Democratic war was officered by Whig generals. Scott had already been a Whig candidate for President. The charge was now made that Scott was kept from command for fear that success might make him a more formidable candidate in 1848. Finally, when he was sent to the front in 1847, Jan., the cry was raised that the purpose was to dim the lustre of Taylor's victories, or at least to divide the popular support between the two generals in such a way as to destroy the political prospects of both.

General Scott invested Vera Cruz in 1847, Mar., and by the 27th had captured the fortress which had been thought to be almost impregnable, and was ready to enter the city. On Apr. 8 he started into the interior, and on the 18th captured Cerro Gordo; the 19th, Jalapa, and the 22d Perota. On May 15 he entered the important city of Puebla. Remaining here for some weeks he again advanced, in August, toward the capital, and on the 10th came in sight of the city of the Montezumas. Two important victories were won Aug. 20—at Contreras and at Churubusco. He captured Molina del Rey Sep. 8, and five days later the victory of Chapultepec gave him the City of Mexico itself, which he entered on the following day with an army of only 6,000 men. The war was practically over, but the victory was so complete that it began to be a question whether there was any government left with sufficient power to negotiate a treaty of peace. An agitation began with friends both in and out of congress, as well as in the cabinet, looking to the annexation of the whole of Mexico. Calhoun on the one hand, Webster and a majority of the Whigs on the other, joined hands to

defeat this plan. President Polk was finally forced to make the ultimate decision. N. P. Triest was sent in 1847, Mar., to Mexico to make a treaty of peace. Failing he was ordered in the fall to return to Washington; but disobeying instructions he remained in Mexico, and on Feb. 2, 1848, concluded a treaty of peace in harmony with his original instructions. The administration was in a quandary. To ratify meant to condone the disobedience of Triest. To reject meant a prolongation of the war, and time to perfect the intrigue for the annexation of 'All Mexico.' President Polk, after some hesitation, decided to send the treaty to the senate for its consideration. Received Feb. 23, it was ratified, after some amendments, Mar. 10, by a vote of 38 to 14. On May 30 ratifications were exchanged and the war was at an end.

The Treaty of Peace.—The treaty of Guadaloupe Hidalgo (q.v.) gave to the administration of President Polk the territory that his diary informs us he intended to acquire, California and New Mexico. Mexico in return for the loss of its fairest northern provinces was paid $15,000,000, and released from all claims of all kinds held by citizens of the United States against her, estimated at $3,250,000, which the United States assumed. Boundary lines were drawn, and provision made in regard to other questions at issue between the two countries.

Results.—Usually successfully waged wars redound to the credit of the party in power. In this case, however, the Democratic party, the author and supporter of the war, was defeated by the Whig party, the party of opposition and criticism, in the presidential election of 1848. The Whigs made use of the popularity of a successful general to defeat the party that had made his glory possible. Evidently the American people were ready to accept the fruits of the war, but also ready to punish the party that they believed had wrought in a wrong manner. Again, a large number of young officers destined to renown in later years proved their worth in this war. U. S. Grant and Wm. T. Sherman on the one side; Robt. E. Lee, 'Stonewall' Jackson and Jefferson Davis on the other, in the great Civil war, foreshadowed, in this Mexican struggle, the greatness that was to be theirs in the 'days that tried men's souls' from 1861 to 1865. The acquisition of 522,568 square miles of territory—an empire four times as large as Great Britain, in itself—was the most important immediate as well as remote result. It was important: first, in the issues that its acquisition precipitated. Should it be slave or free territory? Who should determine its institutions? And out of this question grew the larger one, who had the right to control the institutions of the territories in general? To settle the first question David Wilmot, a Democrat of Pennsylvania, proposed the celebrated 'Wilmot Proviso' (q.v.)



MEXICO.

SCALE OF STATUTE MILES.

0 50 100 200 300 400

States.	Sq. M.	Pop. 1900.	Capitals.	Pop. 1900.
Aguas Calientes	2,895	101,910	Aguas Calientes	35,042
Campeachy	25,832	84,281	Campeachy	.....
Chiapas	16,048	363,607	San Cristobal	.....
Chihuahua	79,021	327,004	Chihuahua	.....
Coahuila	50,890	280,899	Saltillo	23,996
Colima	3,743	65,020	Colima	.....
Durango	42,510	371,274	Durango	31,092
Guanajuato	11,411	1,065,317	Guanajuato	41,486
Guerrero	24,550	474,594	Chilpancingo	.....
Hidalgo	8,163	603,074	Pachuca	37,487
Jalisco	39,168	1,137,311	Guadalajara	101,208
Mexico	7,838	924,457	Toluca	25,904
Michoacan	25,689	935,849	Morelia	37,278
Morelos	1,776	161,697	Cuernavaca	.....
Nueva Leon	23,635	326,940	Monterey	62,226
Oajaca	33,591	947,910	Oajaca	35,049
Puebla	12,021	1,024,446	Puebla	93,521
Queretaro	3,207	228,489	Queretaro	33,152
San Luis Potosi	27,500	582,486	San Luis Potosi	61,019
Sinaloa	36,198	296,109	Culiacan	.....
Sonora	79,021	220,553	Hermosillo	.....
Tabasco	11,851	158,107	San Juan Bautista	.....
Tamaulipas	20,225	218,948	Ciudad Victoria	.....
Tlaxcala	1,620	172,217	Tlaxcala	.....
Vera Cruz	26,232	960,570	Jalapa	.....
Yucatan	29,567	312,264	Merida	34,630
Zacatecas	22,998	462,886	Zacatecas	32,856
Federal District	461	540,478	Mexico	344,721
Cal., Lower	61,562	47,082	La Paz	.....
Terr. of Tepic	11,580	149,677	Tepic	.....

Physical Character, etc.—The great mass of the Mexican territory consists of an elevated plateau, formed by an expansion of the Cordillera (q.v.) of Central America, from which terraced slopes descend with more or less rapid inclination toward the Gulf of Mexico on the e., and the Pacific on the w. This vast tract, 14°—33° n. lat., and 86°—118° w. long., comprises one of the richest and most varied areas in the world; for while its geographical position secures to it a tropical vegetation, the rapid differences of elevation afford it the advantages of temperate climates, in which all varieties of European flora and fauna can come to perfection; and it thus combines within its limits an almost unparalleled exuberance and multiplicity of natural products. The table-lands of Mexico are at elevations 5,000 to more than 9,000 ft. above sea-level, and exhibit great differences of level and varieties of soil. They generally incline northward and are girt in by low mountain chains, among which rise individual lofty peaks—e.g., Cofre de Perote (13,415 ft.), Orizaba (17,362 ft.); while they are intersected by higher ranges, above which tower a few cones—e.g., Ixtaccihuatl, the White Woman (16,076 ft.), and the volcano of Popocatapetl, or the Smoking Mountain (17,450 ft.). These figures are taken from Romero and are the best available. These volcanoes and several others of less note, form a transverse volcanic band between the two oceans, and do not follow the inclination of the central chain, as is the case in the volcanoes of South America. Volcanoes occur also isolated—e.g., in the plain of Mixtecapan, 2,900 ft. above the sea, where, 1759, the volcano Jorullo, which still emits smoke, was formed after an eruption by which a surface of many

sq.m. was raised several ft. above the level of the plain; in fact, every part of the Mexican territory betrays the volcanic nature of its formation. The principal chain intersecting the table-land is the Sierra Madre, in which lie the chief gold and silver mines, and which, after traversing the states of Queretaro and Guanajuato, divides into three main branches, the central of which forms the water-shed between the Pacific ocean and the Gulf of Mexico. In addition to these great chains, the Mexican territory is intersected by numerous minor ranges, which on the Pacific side break up the terraced declivities into innumerable deeply-cleft valleys, which assume almost the character of steep ravines near their junction with the narrow littoral plains of the Pacific ocean. Violent storms rage on this coast, blowing from the s.w. during the hot months, when the climate is as unhealthful to whites as on the Mexican Gulf, though it is rarely visited by the yellow fever. Mexico may be said to be generally deficient in navigable rivers; for though some of the largest have a course of more than 1,000 m., few are free from rapids. The Rio Santiago, or Rio Grande, with a course of 500 m., is broken near Guadalajara by 60 falls in less than three m.; the Rio Grande del Norte, which forms in its lower courses the boundary between Mexico and the United States, has a winding course of nearly 1,800 m., but is navigable only for small sailing-vessels to Matamoras, 60 m. from its mouth, where a bar and numerous shoals obstruct the passage. A similar remark applies to the majority of the rivers which fall into the Gulf of Mexico. The eastern coast generally presents great obstacles to navigation, as it is low and sandy, unbroken by bays or inlets, and lined by sand-banks several miles in width; the only points of access being the mouths of rivers, which are not good natural roadsteads, as, with few exceptions, the rivers have little water, except at the rainy season, which generally sets in about June, accompanied by overpowering heat, during the prevalence of which the yellow fever, or *vomito prieto*, rages like a pest in all these low lands. Important improvements have recently been made in the harbors of Tampico, Coatzacoalcos and Frontera. The best natural harbor, Vera Cruz, has also been the site of great works of improvement for some years past. Mexico is on the whole poorly supplied with water; and since the Mexicans have discontinued the system of irrigation followed through centuries with great success, many tracts have become barren, and unsuited for human occupation. A great portion of the table-lands can be used only for pasture. Springs are rare, and many of the rivers flow in deep mountain-beds, without receiving smaller tributaries, while the rapid evaporation on a light soil, covering porous rocks, leaves the surface dry and hot, and unable to support vegetation other than the cactus and some

low grasses. The plains, moreover, contain the beds of numerous dry salt lakes, but this is chiefly on the n. and e. of the table-land. The western parts of the plateaux 100°—102° w. long. yield, by careful irrigation, rich crops of maize and wheat, and rank among the most fertile agricultural districts of Mexico. They are, however. here and there interrupted by sterile tracts, covered by lava outflows and known as *pedregal* (stony land) or *malpais* (bad country). In contrast with these unprofitable districts, the plains are occasionally broken by depressions of the soil, known as *barrancas,* descending sometimes 1,000 ft., and measuring several miles across, covered with a luxuriant vegetation of trees and shrubs, and watered by small streams running through the middle of the valley. Mexico has numerous lakes, but few of importance; that of Chapala in Jalisco is one of the most considerable, being more than 80 m. long.

Climate, Produets.—The differences of climate, depending on differences of altitude, are so great in Mexico that the vegetable products of this vast country range from those of the equator to those of polar regions. In a few hours, the traveller may experience every gradation of climate, and pass through different zones of vegetation, including wheat and the sugar-cane, the ash and the palm, apples, olives, and guavas. The Spaniards, on their first occupation of Mexico, distinguished its great climatic divisions under the characteristic names, which are still retained, of the *Tierra Caliente* (hot or littoral land), *Tierra Templada* (temperate land), and *Tierra Fria* (cold or high land). The mean annual heat of the Tierra Caliente is 77°; and the soil, generally fertile, produces maize, rice where water can be procured for irrigation, bananas, pine-apples, oranges, etc.; and sarsaparilla, jalap, and vanilla in the littoral swampy forests. This tract has only two seasons—the winter, or season of n. winds, and the summer, or season of breezes. In the winter, hurricanes are the terror of navigators, but the coast is clear of yellow fever, which prevails in the hot season. On the medium elevations of the Tierra Templada, the temperature is extremely equable, varying only from about 70° to 80° F.; the climate healthful, and wherever water is abundant, a perpetual summer reigns, yielding a varied and active vegetation, which embraces all the cereals, fruits, and vegetables of central and southern Europe, among which maize, oranges, lemons, grapes, and olives are in exuberant abundance. The Tierra Fria, which would scarcely have been characterized as cold by discoverers belonging to a less southern climate than Spain, possesses a generally temperate climate, the mean annual heat ranging between 66° and 68° F.; but on the highest of the table-lands the air is keener, and the soil more arid, and agriculture is limited to

the cultivation of barley and of the agave, or Mexican aloe, which is extensively cultivated for its juice, which is made into the fermented drink known under the name of *pulque*. In addition to the vegetable products above referred to, Mexico yields coffee, tobacco, yams, capsicums, pepper, allspice, indigo, ipecacuanha, dragon's blood, india rubber, mahogany, rosewood, ebony, etc.

The products of the mines, which rank among the richest in the world, include the precious metals. The early gold mines of Mexico were principally on the western side of the Sierra Madre, n. of 24° n. lat., and, until the discovery of the metal in Australia, their yield surpassed the product of any other part of the world. Silver mines abound in Mexico and the argentiferous veins, which may be said to intersect every part of the western declivities of the Cordillera, occur in some places—e.g., in the *Veta Madre* lode at Guanajuato—in beds 10 to 50 yards in depth; the precious metal being in these cases intermixed with sulphur compounds, antimony, and arsenic. But though these mines possess the additional special advantage of being in fertile districts, affording abundant food to miners and their cattle, their working has been very imperfect, owing to the unsettled state of the country. At the close of the 18th, and the beginning of the 19th c., the annual value of the gold and silver of Mexico was more than $30,000,000, of which nine-tenths were yielded by the silver; but the political disturbances, preceding and consequent on the wars of independence, very considerably reduced this sum. Recently interest in mining has greatly increased. The states of Sonora, Sinaloa, Durango, Guerrero, and Oaxaca have become active mining centres. In addition to gold and silver, Mexico yields tin, antimony, mercury, copper, lead, iron, and zinc; while carbonate of soda, used in smelting silver, is found crystallized on the surface of several lakes, and occurs, with common salt, in dry seasons, on the more arid parts of the surface of the elevated table-lands. The gold production in 1906-7 was valued at $36,563,898.24; that of silver at $77,088,827.

Cattle, horses, asses, mules, and sheep abound in Mexico, where, in consequence of the extent and excellence of the pasture grounds, all the domestic animals introduced from the old world have multiplied excessively. Among the wild animals are the tapir, wolf, puma or panther, jaguar, wild-cat, skunk, the brown porcupine, stag, deer, etc. Parrots, humming-birds, and game birds, including turkeys, are abundant; and almost all the lakes yield fish in abundance. The cochineal insect was formerly of commercial importance, and the silkworm is reared with great success, locally, on the table-land.

Agriculture.—This is backward in Mexico, from the ignorance and poverty of the peasants, and the scantiness of transportation and lack of improved machinery,

but the government labors assiduously to encourage it, by distributing pamphlets, seeds, plants, etc., especially vines, olive and fruit trees, cork oaks, flax and fodder plants, mulberry trees and silkworms; and by extending irrigation works. In 1900 299,280 sq.m., or two-fifths the entire surface, was uncultivated. This, of course, is largely made up of the vast sandy deserts of the north—the Bolson de Mapimí is a rocky wilderness of 50,000 sq.m., in Coahuila and adjoining states. Even so, much more is possible. The different climatic levels give a wonderful range of production, from the cereals and cattle of the northern regions, and the coffee of the temperate, to the cacao and sugar of the tropics. On the high lands are raised corn (over 100,000,000 bushels in 1900), barley, and wheat, the favorite Mexican *frijoles* or beans (12,314,400 bushels), large quantities of sweet and some common potatoes. On the plain of Apam grows the maguey (century plant), from which the celebrated Mexican *pulque* and its distilled product *mescal* are made, also yielding a fibre useful for soap, and razor strops. Coffee is cultivated widely, the centre of production being Vera Cruz, and the best brands esteemed equal to Mocha; the total crop in 1903 was valued at $11,440,515, of which Vera Cruz produced $7,825,387. Cacao, predominantly in Tabasco, total value $1,734,266; tobacco (do.), total value $4,541,581; vanilla, chiefly in Vera Cruz, value $758,633. Sugar cane (see *Manufactures*) yields 40 to 60 tons an acre. A coarse-stapled cotton is extensively grown in Durango and Coahuila, from 50,000,000 to 100,000,000 pounds annually. But next to corn, the most valuable production is that of fibre, from several varieties of agave. The chief is henequen or sisal hemp, valued for cables from its resistance to wet; product in 1903 valued at $41,087,852. Of ixtle or istle (*pita*, silk grass), for cordage, hammocks, bagging, etc., the product was valued at $2,953,213. The value of other large crops was as follows: Rice, $2,928,693; corn, $82,162,962; wheat, $19,235,784; sugar, $15,742,325; frijoles, $10,175,930; barley, $6,641,181; molasses, $6,477,374; pulque, $13,020,913. Rice and some indigo are also raised. The northern states are immense cattle ranges, and about 3,000,000 of beef cattle, sheep, swine, and goats are annually slaughtered, valued at about $46,000,000.

Manufactures.—President Diaz has endeavored to develop Mexican industries by high tariffs on all manufactured articles; but so far there is little beyond manufacture for local needs. The most important branch is that of goods from unbleached cotton or *manta*, which utilized in 1900 58,459,913 pounds of cotton, and in 1904 63,582,313 pounds. There are 119 cotton mills, employing 27,706 hands, and turning out over 12,500,000 pieces of cloth and 4,000,000 pounds of yarn, the latter much used in shawls and *rebozos* or scarfs. Next is the

woolen manufacture, largely a hand-loom business, but with two or three dozen mills; this is predominantly of the *zarape*, used by millions of Mexicans as a cloak by day and a blanket by night; but also of mixed cotton and wool blankets, knit underwear, carpets, and other articles. The silk industry is slight but growing, and there are a few paper mills. The third most considerable manufacture, however, is that of coarse pottery, carried on by local potters in every town, and in great variety of colors, glazes, etc. The sugar manufacture is growing; in 1905 it produced nearly 140,000 tons. The manufacture of aguardiente in 1904 was valued at $11,836,126; of sugar, $16,974,547; of molasses, $5,303,-032; of syrup, $3,335,317; and of pulque, $11,125,032. A large distillation of rum from molasses is carried on, as well as of *mescal* and *tequila* from pulque; there were over 2,000 distilleries. Nearly every town has a cigarette factory, and some have also cigar factories, and some 20,000,000 pounds of tobacco a year is thus employed, which does not supply the local demand. There is a small iron manufacture of household and agricultural implements; in Leon a considerable manufacture of hardware and cutlery; and in the City of Mexico is a government cannon foundry and arsenal. A little glass is made. Leather work is widely spread, centring in Leon; felt hats are made in the chief cities, straw hats in all; hammocks largely, especially in Yucatan; silver is wrought in all parts. There is a large, widely scattered manufacture of chocolate and confectionery; cottonseed-oil mills are numerous.

Commerce and Transportation.—Mexico has few good harbors on the Atlantic; but on the Pacific coast are the matchless ones of Guaymas, Acapulco, Manzanillo, and San Blas, and several others. The foreign commerce, chiefly with the United States and Europe, centres at Vera Cruz and Tampico on the Atlantic side. This amounted in 1906-7 to imports of $233,363,388.85, and exports of $248,018,010. From 1874 to 1904—a very brief period as time is computed in the making of a nation's history—the exports of merchandise by Mexico to the United States increased from $4,346,334 to $43,633,275, and the imports from the United States increased from $5,946,839 to $45,844,720. In the fiscal year 1905-6 the imports from all countries amounted to $220,651,074. Of this sum $16,386,828.71 consisted of animal substances; $32,616,928.93 of vegetable substances; $90,937,430.56 of mineral substances; $23,022,-528.30 of dry goods; $7,744,272.98 of chemical and pharmaceutical products; $7,246,351.07 of spiritous liquors and other beverages; $5,417,192.11 of paper and its applications; $20,539,212.70 of machinery and its parts; $4,620,031.53 of vehicles; $4,122,237.03 of arms and explosives, and $7,998,060.57 of miscellaneous articles. Increase over the previous year, $42,446,112.04. In the

same year the exportations totaled $271,138,809.32, the principal articles being: gold in various forms, $31,695,777.38; silver in various forms, $125,400,083.77; copper, $28,655,897.35; vegetable products, $62,928,135.51; animal products, $11,723,435.23; manufactured products, $2,978,441.02; miscellaneous, $799,621.57. Increase over the previous year, $62,618,357.89. Of the total importations, $145,600,313.49 were from the United States; $20,814,557.09 from Germany; $20,344,643.81 from Great Britain; $16,383,255.95 from France, and $7,595,531.31 from Spain, the remainder being divided among the other countries in amounts ranging from $1,000 to $2,500,000. In the same period the exportations totaled $271,138,809.32, as follows: gold in various forms, $31,695,777.38; silver in various forms, $125,400,083.77; copper, $28,655,897.35; lead, $4,967,806.23; other minerals, $1,989,621.26; coffee, $9,288,623.32; henequen, $29,437,318.50; hides, uncured, $7,882,867.25; vanilla, $4,157,394.99; textile, $3,667,844.88; beans, $3,791,212.97; cattle, $3,271,837.50; leaf tobacco, $2,216,282.06; chewing gum, $1,696,523.33; fresh fruits, $295,334.20; zacaton root, $1,872,757.00; woods, $1,881,961.67; sugar, $674,235.00; panama hats, $556,748.29; miscellaneous, $6,939,060.79. Of the total exportations, $166,010,052.43 were to the United States; $41,672,873.19 to Great Britain; $20,523,156.33 to Germany; $8,010,279.73 to France; $7,266,821.73 to Belgium; $2,201,295.00 to Spain, and $528,377.80 to Guatemala; no other country receiving $500,000. In the previous fiscal year the importations were $178,204,962.45, and the exportations, $130,303,978.09. Only as far back as the fiscal year 1894-5, the imports amounted to but $66,200,000 and the exports to $95,000,000, a remarkable record of material progress in the brief period of 11 years.

Further evidence of the wonderful commercial growth and importance of Mexico in recent years may be found in the statistics of the business done through her ports of entry. In 1904, the total number of steam vessels entering these ports was 4,744, having an aggregate carrying capacity of 4,984,437 tons, and the number of sailing vessels was 2,796, with a total carrying capacity of 367,131 tons. The actual amount of cargo discharged was 4,559,101 tons by both steam and sailing vessels. In the same year, 4,737 steam and 2,807 sailing vessels departed from the ports of the country, carrying a total cargo of 3,466,568 tons. From 1889 to 1904, inclusive, there was an increase of 2,324 in the number of vessels, both steam and sailing, which entered these ports. Of the entries in 1904, there were 5,946 from the ports of the republic, 822 from the United States, 351 from England, 122 from Cuba, 94 from Germany, 57 from Guatemala, 30 from France, 20 from Brazil, and 15 from Spain, while of the total sailings, 5,892 were to the ports of the republic, 916 to the United States, 305 to

England, 208 to Cuba, 67 to Germany, 54 to Guatemala, 20 to Spain, 15 to France, 15 to Italy, and 12 to Australia. The railway system dates only from 1873, when the first road—from the capital to Vera Cruz, 263 miles, with immensely steep gradients—was opened; but it has now over 12,250 m. of main track, well distributed across the country, extremely plentiful in the centre, and with long branches into the mining regions. The chief lines are the Mexican, Mexican Central, Mexican National, Great Eastern, International, Interoceanic, Mexican Northern, and Mexican Southern.

Government.—The country is a federal republic modeled on the United States, its states being internally supreme. The separation of executive, legislative, and judicial powers is maintained as with us. The constitution is of 1857, Feb. 5, but the amendments of 1873, Sep. 25 (under Lerdo, after Juarez' death) are of capital importance. These definitely separate church and state, forbid congress to establish or hamper any religion or establish monastic orders on any pretext, constitute marriage a civil contract, and substitute affirmation for religious oath. The executive is a president elected by popular vote (through electors, mere registrars as with us) for four years; by constitutional amendment of 1890, Dec. 20, he may be consecutively re-elected indefinitely. He is inaugurated the first of December following his election. There is no vice-president; temporary absences or disabilities are filled by the secretary of state; for permanent ones congress elects a provisional president till an election can be held. He has a cabinet of seven—foreign affairs (state); interior; justice and public instruction; *fomento* (patronage) of industry and colonization; communications and public works; finance and public credit; war and marine. The legislative body is composed of a senate and a chamber of deputies. The senate is composed of two senators (each with an alternate) from each state, and the federal district, indirectly elected; the term is four years, and half of them are chosen every two. The deputies are indirectly elected, one for every 40,000 inhabitants or fraction over 20,000; term two years; each has an alternate. There are two sessions of congress each year: a spring one, Apr. 1 to May 31 (specially continuable 15 days longer), to audit accounts and make appropriations; a second Sep. 16 (the national holiday) to Dec. 15, continuable 30 days longer, for general business. The judiciary is a supreme court of justice, with district and circuit courts. The former consists of a chief justice and 11 associates, 4 alternates, an attorney-general, and a public prosecutor; they are elected for six years by indirect popular vote. There are 3 circuit and 32 district courts. The state governments are much like the national in organization, save that in general the legislature has but one cham-

ber, and the governor is elected for four years. The states are divided into districts governed by prefects; the towns have councils called *ayuntamientos*. Despite the reserved rights of the states, the mining and commercial legislation was unified in 1883.

Finances and Banking.—The total revenue for 1908-9 was estimated at $103,385,000; the expenditures at $103,203,824; the expenditures are estimated in budgets and held close to it. The interest on debt, army and navy, and public works, are the chief items of expenditure. The state revenues aggregate about $20,000,000, and the municipal $16,500,000. The funded debt in 1906 amounted to 445,899,961 pesos; the unfunded debt, including floating, non-interest bearing, and other debts, amounted to 860,495 pesos; or a total in United States currency of $222,058,181.

The aggregate capitalization of the chartered banks on Apr. 30, 1907, was $162,600,000; amount of notes in circulation, $99,072,830; bonds in circulation, $18,450,400; reserve fund, $54,895,119; gold on hand, $48,643,467; silver on hand, $17,713,981; notes of other banks, $6,745,973; loans on securities, $113,782,569; loans on mortgage, $22,685,381; call deposits, $33,426,915; time deposits, $31,910,132; credit account, $316,156,285; bills discounted, $198,874,703; investments, $25,741,761; debtor account, $264,005,180; value of buildings, $7,602,397.

The National Bank maintains branches in the cities of Chihuahua, Durango, Guadalajara, Guanajuato, Mazatlan, Merida, San Juan Bautista, Monterey, Oaxaca, Puebla, San Luis Potosi, Vera Cruz, Zacatecas, and Tampico; and the Bank of London and Mexico is similarly represented in Vera Cruz, Puebla, Quaretaro, Lerdo, Monterey, Guanajuato, Guadalajara, San Luis Potosi, Morelia, and Mazatlan. The Central Bank, of Mexico City, is practically a clearing house for the country banks throughout the republic, all of which own more or less of its stock and are its correspondents in the cities where located. The total banking capital of the republic, including banks of issue and all others which make their capitalization public, is $162,600,000 Mexican money. If to this amount be added the capital of the half dozen or more institutions which do not make this feature of their business public, or which are branches of foreign banks, as in the cases of the bank of Montreal and the International Banking Corporation, the grand total becomes considerably larger.

Army and Navy.—The strength of the permanent army is 3,259 officers and about 24,000 men; this force may easily be increased to 60,000 in time of war, and there is sufficient stock of equipment in the national arsenal at Mexico City for 100,000 men. The regular army is divided into 28 battalions of infantry, 1 battalion of sappers and miners, 14 regiments of cavalry

and 20 batteries of artillery. In addition to the regular is the first army reserve, consisting of the rurales (about 3,500 cavalry patrols under the interior department), the fiscal guard (1,000 cavalry in the customs service), and the state police organizations, in all about 26,000 men. Military education for officers is supplied at the Chapultepec Military Academy and at the Escuela Militar de Aspirantes at Tlalpam, a suburb of Mexico City. The navy consists of 4 gunboats of from 1,000 to 1,210 tons, 2 training ships, 1 small gunboat of 450 tons and several smaller craft. There is a naval academy at Vera Cruz.

Education.—The system has been revolutionized, or it may be said created, within a quarter of a century—that is, since President Diaz's accession. There is a great non-sectarian public school system supported by the national and state governments; primary education is nearly everywhere compulsory. The schools are divided into primary elementary, primary superior, and preparatory (professional and technical); the latter, for higher education, are found in the leading cities. In the federal district and the territories, the system is under the direct control of the executive. Churches and private associations also support many schools. The federal government likewise supports normal schools, schools of jurisprudence, commerce and administration, agriculture, veterinary, science, fine arts, and arts and trades for both sexes; a national conservatory of music, schools for the blind and mutes, reform schools, etc., besides museums and 17 libraries, the largest with over 150,000 volumes. According to the latest statistics the number of primary schools supported by the federal or state governments is 6,350, and by municipalities, 2,955; total, 9,305; and the attendance 484,570—males, 299,289; females, 185,281. There are 49 secondary and preparatory schools supported by the federal and state governments, with an attendance of 5,561, of which 4,056 are males and 1,495 females. There are 37 'professional' schools, with an attendance of 2,834, of which 1,667 are males and 1,167 females; total number of teachers and other employees of public schools, 18,024; expenses, $8,454,329. Number of private schools, 1,790; number supported by the clergy, 437; and by associations, 150. Of these 2,339 are primary, 29 secondary, and 9 professional; attendance 60,087 males, 52,916 females—total 113,003. The grand total of schools of all kinds is 11,794 and attendance 605,968, of which 365,099 are males and 240,859 females.

The number of public libraries is 135, containing 743,559 volumes; number of museums 37, of which 9 are archæological, 7 scientific, 7 natural history, 1 geological and metallurgical, 3 agricultural, 1 medical and anatomical, 1 industrial, 2 commercial, and 6 miscellaneous. There are 56 scientific and literary societies and 429 publications, of which latter 10 are dailies, 10 tri-week-

lies, 30 semi-weeklies, 225 weeklies, 4 tri-monthlies, 57 semi-monthlies, 6 monthlies, and 11 irregular. Of the total number, 43 are official organs, 56 political, 36 religious, 41 scientific, 61 literary, 4 scientific and literary, 5 musical; 74 are devoted to general information, 12 to commercial topics, 14 to education, 16 to industries, 12 to art, and 65 to miscellaneous subjects and interests.

In 1900 there were 1,273,325 males and 906,263 females who could read and write; 163,568 males and 184,335 females who could read but not write; and 3,119,944 males and 3,664,680 females above the age of 12 years who could neither read nor write.

A law was enacted in 1888 but not put into force until 1896, making elementary education compulsory and compelling the establishment and maintenance of at least one public school for every 4,000 inhabitants. Under the provisions of this law the advance in education and educational methods throughout the republic has probably been without a parallel.

Religion.—The Roman Catholic is the dominant church of Mexico, but all other sects are tolerated. Mexico has 5 archbishops and 20 bishops. All religious orders are prohibited by law. The Jesuits have been expelled from the republic.

Archæology is represented by interesting relics of every conceivable description, exhibiting the aboriginal condition and progressive stages of culture among the many prehistoric and historic races that inhabited Mexican territory in pre-Columbian periods (see AZTEC CONFEDERACY). From the flaked flint arrowheads of the palæolithic savage to the elaborately carved gold and other ornaments, and vast stone buildings of the Aztecs and Toltecs of the Nahua nation, these relics are to be found in bewildering profusion. The number of minor statuettes, carvings, amulets, and ornaments in stone is enormous, as are also metal objects of the Bronze Age, and finely carved articles of wood and other material, in which the graving implements employed were of stone and copper, iron not having come into use. Even in the variety of their richly colored pottery, beautifully ornamented with elaborate and symbolic designs, is traced strong evidences of the separate tribes and nations, each possessing its individual and distinctive ware. All these relics bear mute testimony to the customs, habits, or religious rites of native races. for the study of which Mexico affords an inexhaustible and ever productive field, as witnessed by the recent travels and researches of Prof. Carl Lumholtz, the eminent ethnologist, among the primitive Huichols or Virarikas, a little known tribe of Indians in the state of Jalisco. These have added a vast amount of information on aboriginal ancestral rites and customs, the Huichols having carefully preserved traditions which include a ver-

sion of a flood which lasted for five years, and an ark which rested on a mountain in Mexico, instead of Mount Ararat, the representations of this ark, and Grandmother Growth, the Mother of the Gods who predicted the flood, being among the objects of superstitious veneration that are used in their ceremonials.

But the most impressive of Mexican archæological features are the ruins of monuments, temples and cities scattered throughout the land. Among these the more important are the cliff ruins and deserted pueblos of the Casas Grandes and other localities in the state of Chihuahua in the north; those of Quemada in Zacatecas farther south; of Tula, the northernmost centre of Toltec culture; the remains of chambers, statuary, etc., carved out of the solid rock on the hill of Texcocingo, a few miles beyond Texcoco; the pyramids, and the street of the dead, half a mile long, lined by *teocallis*, ruined temples and other structures, among which were found the Almaraz monolith, weighing over 18 tons, at San Juan Teotithuacan, 25 m. n. of Mexico City; the pyramid at Cholula, w. of the city of Puebla and about 60 m. s.e. of Mexico City, the largest in the country, upward of 1,400 ft. at its base, and nearly 200 ft. high, which was stormed and captured by Cortes, who replaced the Toltec temple, crowning its summit by a Roman Catholic church; the vast ruins on the oblong conical hill 2 m. in circumference and 400 ft. high at Xochialco, about 65 m. s.w. of Mexico City; and the remains of the six palaces, three pyramids, and other structures at Mitla, 15 m. s.e. of Oaxaca. Minor groups are to be found at Monte Alban, the ancient capital of the Zapotecs, Tehuantepec, and Zachila in Oaxaca; and at various places in the Huaxtecan and Totonacan districts, and the Maya region. Tenochtitlan, the Aztec capital, and Texcoco, the Acolhuan capital, were with the downfall of the inhabitants leveled to the ground by the Spaniards, and scarcely any vestige of their having existed is to be found. The site of Tenochtitlan is now occupied by Mexico City and the present cathedral is built where the great *teocalli*, reached by 120 steps, stood; here during excavations in 1789 were found two notable relics of the Aztec capital, the Calendar stone, and the Huitzilopochtli, a composite idol representing the cruel god of war and goddess of death. These are carefully preserved in the Muséo Nacionál in Mexico City, together with a vast quantity of other valuable archeologia, including numerous hieroglyphic and pictographic codices in the native ideographic writing, the decipherment of which is gradually adding to the sum of knowledge concerning ancient Mexico. See *Literature*. Consult: Bandelier, *An Archæological Tour in Mexico* (1885); Campbell, *Complete Guide and Descriptive Book of Mexico* (1885); Ober, *Travels in Mexico* (1898).

Literature.—In the summer of 1518 when a Spanish

squadron commanded by Juan de Grijalva discovered Mexico, then ruled by Montezuma II., he found there a highly developed nation with organized armies, official administrators, courts of justice, agricultural, mechanical, and fine arts, and stone buildings, some of them of vast proportions, and conspicuously ornamented. When the first ambassadors sent by the Mexican king to Cortes arrived, the Spanish conqueror was particularly impressed by the artists in their train, who in their pictographic and hieroglyphic writing made descriptive sketches of the Europeans and their accoutrements, in reality acting as our modern reporters, and giving the Old World the first idea of a new literature. The astonishment of European scholars and their researches into the origin of these hitherto unknown peoples gave rise to a whole literature. The details of ancient Mexican civilization are now generally admitted to be of Asiatic origin, and dating from an intercourse as recent probably as the Christian era. The Aztec calendar of 360 days divided into 18 months of 20 days each compared with that in use in eastern Asia exhibits marked points of similarity, and actual documents of native Aztec history in their ideographic writing, or copies of them, are open to the study of scholars, and are being deciphered and published from time to time. After the Spanish conquest, interpretations of many were drawn up in writing by Spanish educated Mexicans, and histories founded on them with the aid of the traditional memory were written by Fernando de Alva Ixtlilxochitl (1568—1648), the royal Texcucan chronicler, Tezozomoc, son of Cuitlahuac, the last Mexican emperor, and others. The documents purporting to be histories, written by natives in later times, thus more or less represent real records of the past, but the task of separating the preponderant mythical part from what is real history is of the utmost difficulty. Turning to the native chronicles of the Mexican nations, these are found to be substantial records, going back to the 12th or 13th c., with some vague but not worthless recollection of national events from times some centuries earlier. These last mentioned traditions, in some measure borne out by linguistic evidence of names of places, tribes, and persons, point to the immigration of detachments or branches of a widespread race speaking a common language, which is represented to us by the Aztec, still a spoken language in Mexico. Chief of these branches were the Toltecs, with whom is associated the mysterious tradition of Quetzalcoatl, a name which presents itself in Mexican religion as that of a great deity, god of the air, and in legend as that of a saintly ruler and civilizer. His brown and beardless worshippers described him as of another race, a white man with noble features, long black hair and full beard, dressed in flowing robes. He came from Tullan or Yucatan (stories differ widely)

and dwelt 20 years among them, teaching men to practice austerity and virtue, and to hate violence, war, human and animal sacrifices. Legends tell of his teaching picture-writing, the use of the calendar, artistic silver work, and building, of which the mound of Cholula and other edifices bear witness (see *Archæology*), but at last he departed, some say toward the unknown land of Tlapallan, but others to Coatzacualco, on the Atlantic coast, on the confines of Central America. Thence before his final disappearance he sent back his companions to tell the Cholulans that in a future age his brethren, white men and bearded like himself, would land there from the sea where the sun rises, and come to rule the country. About 1430 took place the triple alliance of the Acolhua, Aztec, and Tepanee kings, whose capitals were Tezcuco, Tenochtitlan, now Mexico, and Tlacopan. The Aztecs then became so predominant that the rest of native history may be fairly called the Aztec period, notwithstanding the picturesque magnificence and intellectual culture which made Tezcuco celebrated under Nezahualcoyotl and his son Nezahualpili (see AZTEC CONFEDERACY).

After the Spanish conquest, Mexico became the scene of active original study, and the foundations of the literature of the New World were laid, when in 1536 Juan Cromberger, the publisher of Seville, under the patronage and advice of viceroy Antonio de Mendoza and Juan de Zumarraga, first bishop of Mexico, established a printing press, with Juan Pablos as his foreman. The chief of early works relating to native history are those of Motolinia, *Historio de los Yndios de la Nucva Espana* (1541); Sahagun *Historia de las Cosas Antiguas de los Indios* (1566); Diego Duran *Historia de los Indios de Nueva Espana y islas de Tierra firme* (1581); the princely Tezozomoc, *Cronica Mexicana* (1600); Torquemada, *Monarquia Indiana* (1615); the *Letters of Cortes,* the standard edition of which is the handsome publication of Lorenzana (Mexico 1770); and the works of native authors including Camargo, Chimalpain, the three Ixtlilxochitls, Pomar, Tobar, Zapata and others. Early verse is represented by Saavedra Guzman, *El Peregino Indiano* (1599), and by Villagran's sprightly epic on the New Mexican conquest, both poor poetry, but interesting and valuable chronicling. From its establishment in 1536 to 1600 over 100 volumes were published by the native press, the bulk of a religious character including catechisms, vocabularies, sermons, etc., in the various Nahuan dialects, the remainder volumes of law, history, medicine, music, etc., in Latin and Spanish.

The Mexican literary celebrities of the 17th c. were Carlos de Siguenza y Gongora (1645—1700), the cosmographer of New Spain, professor of mathematics in the University of Mexico, the author of numerous scien-

tific and literary works in prose and verse; Enrico Martinez, *Reportorio de los Tiempos y Historia natural desta Nueva Espana* (1606; the Pueblan poet Matias Bocanegra; the poetess Juana Inés de la Cruz (1651—1695), surnamed on account of her attributes *The Tenth Muse,* who left the vice-regal court to become a nun; the dramatists Juan Ruiz de Alarcon and Eusebio Vela; and Fray Augustin de Vetancourt, whose *Teatro Mexicano* appeared in 1698. The 18th c. was comparatively barren of original work, but distinguished by general and classic culture and prolific in journalistic development and progress, the leaders of which were José Antonio de Alzate, Francisco Sagahun de Arevalo and José Ignacio Bartolache. Among writers of local history of this period are Veytia (1718—79) and Morfi (d. 1793).

The list of Mexican students, historians, and literary men of the 19th c. is a long one. Chief of local historians and a prominent statesman is Lucas Alaman (d. 1853) with *Disertaciones sobre la Historia de Mejico* (3 vols. 1844-9), and *Historia de Mejico* (5 vols. 1849-52); others of prominence are Orozco y Berra (1816—81), *Historia Antigua de Mejico;* Bustamente (d. 1848); Mora, Ramirez, and Zamacois; while of interest and value is the *Diccionario geografico, historico, y biografico de los Estados Unidos Mexicanos* (1889) of Antonio Garcia Cubas. Among the poets are the physician Manuel Carpio (1791-1860), best represented by *La Cena de Baltasar;* Guillermo Prieto (1818-97), poet and statesman, whose *Musa Callejera* (Highway Muse), and *Romancero Nacional,* made him the national laureate; Ignacio Manuel Altamirano, orator, poet, and novelist, whose novel *Clemencia* is his best known work; Salvador Diaz Miron; Juan de Dios Peza; Ancuña; and José Joaquin Fernandez de Lizardi, who has been named *El Pensador Mexicano.* Representative dramatists are Rodriguez Galván and Fernando Calderon, and in comedy Manuel E. Gorostiza (1789-1851), whose most popular works are *Contigo pan y Cebollas* and *Indulgencia para todos.* One great feature of modern Mexican literature is the moral and material support given by the Government, the Ministerio de Fomento (Ministry of Encouragement) supplying the funds for the issue of any work that—with a conservative judgment—is deemed worthy. Among recent examples are the historical works of the late Icazbalceta, and of Alfredo Chavero; the monographs of Peñafiel and Garcia-Cubas; the legends of Gonzalez Obregon, etc. Consult: Piementel, *Historia critica de la literatura y de las ciencas en Mexico* (1885); Lummis, *The Awakening of a Nation* (1899).

History.—According to native tradition, the history of ancient Mexico exhibits two periods, the first of which, that of the Toltecs, appears to have begun in the 7th and ended with the 12th century; while the second, that of the Aztecs, began 1200, and may be said to have been

closed by the conquest of Cortes 1519; for, though the race has maintained occupation of the Mexican territory, its existence as a nation ceased with the Spanish domination. The origin and primitive seats of the Toltecs are shrouded in mystery; it is said that they came from the n., from a locality designated Tullan, and whence they brought to the valley of Mexico the first elements of civilization. Their laws and usages stamp them as a people of mild and peaceful instincts, industrious, active, and enterprising. They cultivated the land, introduced maize and cotton, made roads, erected monuments of colossal dimensions, and built temples and cities, whose stupendous ruins in various parts of New Spain still attest their skill in architecture, and explain why the name Toltec should have passed into a synonym for architect. When Cortes conquered Mexico, 1519, many of these vast ruins seemed as ancient as now—their gigantic masses even then overgrown with forest trees. (See CHOLULA; PALENQUE.) The Toltecs knew how to fuse metals, cut and polish the hardest stones, fabricate earthenware, and weave various fabrics: they employed hieroglyphics (q.v.) for record of events, were acquainted with the causes of eclipses, constructed sun-dials, devised a simple system of notation, and measured time by a solar year, composed of 18 months of 20 days each, adding 5 complementary days to make up the 365, and intercalating $12\frac{1}{2}$ days at the expiration of every 52 years, which brought them within an almost inappreciable fraction to the length of the tropical year, as established by the most accurate observations. These and other arts, with a mild form of religion, and a simple but just mode of administering the laws, the Toltecs bequeathed to the Aztecs, who engrafted upon the civilization of their predecessors many fierce and sanguinary practices in their religious, and many puerile usages in their social, life. Nothing is known of the exact time, and still less of the manner and causes, of the departure of the Toltecs from Mexico; but it has been conjectured that they went toward the south, and that the colossal architectural remains of the cities of Palenque, Uxmal, and Mitla, in Central America, are the work of their hands. The Aztecs, as we have said, imparted to the institutions of the Toltecs a tinge of their own sombre cruelty, and produced an anomalous form of civilization, which astonished the Spaniards by its mingled mildness and ferocity. Like the Toltecs and Chichimecs, a rude tribe who had succeeded them, the Aztecs came from the north, and after wandering from place to place, founded 1325 the city of Tenochtitlan, or Mexico. On the arrival of the Spaniards, their government was a confederacy of tribes, under the control of an elected chief. Their laws were severe, but justice was administered in open courts, the proceedings of which were perpetuated by picture-written records.

The Aztecs believed in one supreme invisible creator of all things, the ruler of the universe, named Teotl—a belief, it is conjectured, not native to them, but derived from their predecessors, the Toltecs. Under this supreme being stood many inferior divinities, each of whom had his sacred day and festival. At their head was the patron god of the Aztecs, the frightful Huitzilopochtli, the Mexican *Mars*. His altars were drenched with the blood of human sacrifice. Cortes and his companions (see DIAZ) were permitted by Montezuma to enter the temple in the city of Mexico, and to behold the god himself. 'He had a broad face, wide mouth, and terrible eyes. He was covered with gold, pearls, and precious stones; and was girt about with golden serpents. . . . On his neck, a fitting ornament, were the faces of men wrought in silver, and their hearts in gold. Close by were braziers with incense, and on the braziers three real hearts of men who had that day been sacrificed (Helps's *Spanish Conquest in America*, II., book x., chap. 4). The smell of the place, we are told, was like that of a slaughter-house. To supply victims for these sacrifices, the Aztecs made war on all the neighboring and subsidiary tribes, or in case of revolt in any tribute-paying city, and levied a certain number of men, women, and children by way of indemnity. The victims were borne in triumphal processions, and to the sound of music, to the summit of the great temples, where the priests, in sight of assembled crowds, bound them to the sacrificial stone, and opening the breast, tore from it the bleeding heart, which was either laid before the image of their god, or eaten by the worshippers, after having been carefully cut up and mixed with maize. In the years immediately preceding the Spanish conquest, not less than 20,000 victims were annually immolated. These atrocities were incongruously blended with milder forms of worship, in which fruits, flowers and perfumes were offered up amid joyous outbursts of song and dance. According to their mythology, Teotl, who delighted in these purer sacrifices, had once reigned in Anahuac (a name which at first probably applied only to the country in the immediate vicinity of the capital), in the golden age of the world, but being obliged, from some unexplained cause, to retire from earth, he departed by way of the Mexican Gulf, promising to return. This tradition accelerated the success of the Spaniards, whose light skins and long hair and beards were regarded as evidences of their affinity with the long-looked-for divinity. The Mexican priesthood formed a rich and powerful order of the state, and were so numerous that Cortes found as many as 5,000 attached to the great temple of Mexico. The education of the young of both sexes remained till the age of puberty in the hands of the priests and priestesses; and the sacerdotal class were thus able to exercise a widely-diffused influence, which, under the later rulers, was almost equal to that

of the emperor himself. The women shared in all the occupations of the men, and were taught, like them, the arts of reading, writing, ciphering, singing in chorus, dancing, etc., and even initiated in the secrets of astronomy and astrology.

On the arrival of Cortes, 1519, the Aztec leadership was held by Montezuma, an energetic prince, who, after his election to the office, which for several generations had been occupied by his ancestors, made successful war on the powerful neighboring state of Tlaxcala, and on Nicaragua and Honduras; after a time, however, he grew indolent, and alienated the affections of his subjects by his arrogance and exactions, and by his unremitting devotion to the services of the temples. According to the oracles which he frequently consulted, great changes were impending over the empire, the return of Quetzalcoatl was near at hand, and the fall of his race was impending. The tidings of the arrival on the coast of the expedition of Grijalva, 1518, terrified Montezuma and his priestly councillors; and when the hieroglyphic reports of his provincial officers announced the landing in the following year of Cortes and his companions, he endeavored to propitiate the dreaded strangers by sending an embassy charged with valuable gifts to meet them. The road to success was thus open to the Spanish captain, who, with a handful of men, advanced from San Juan de Ulloa to Mexico, and reduced the Aztecs, whose power crumbled to dust before the greater energy and superior civilization of their Christian invaders. In 1540, Mexico was united with other American territories under the name of New Spain, and governed by viceroys appointed by the mother country. The intolerant spirit of the Roman Catholic clergy led to the suppression of almost every trace of the ancient Aztec culture, while the strict system of sequestration enforced in Mexico crippled the resources of the colony; yet notwithstanding these drawbacks, Mexico ranked first among all the Spanish colonies in population, material riches, and natural products. It may be said to have vegetated for nearly three centuries in semi-quiescent prosperity, interrupted by few disturbances of any kind until 1810, when the discontent, which had been gaining ground against the viceregal power during the war of Spain with Napoleon, broke into open rebellion under the leadership of a country priest named Hidalgo. Hidalgo's defeat, and death by execution 1811, put a partial stop to the insurrection; but the atrocities committed under the sanction of the new viceroy, Calleja, exasperated the people, and gave irresistible impulse to the revolutionary cause. Guerrero and Iturbide in turn gained signal advantages over the Spaniards. For a time, Iturbide maintained a self-established imperial rule over the colony; but on the downfall consequent on his tyrannical abuse of power, a constitutional mode of government was inaugurated, and 1824 the independence of

Mexico, which had then chosen a federal republican form of government, was finally established, and in the following year definitely recognized by every foreign power, except Spain. The Mexican war was stained with excesses and atrocities on both sides; but the Spaniards gained unenviable pre-eminence by the wanton cruelty which characterized their conduct of hostilities. With them the war was one of extermination, every commander being allowed, at his own discretion, to hunt down and slaughter the insurgents like brutes. The welfare of the new republic was unhappily disturbed by constant outbreaks of civil war under the leadership of the Escosses, or aristocratic faction, and the Yorkinos, or democrats; and the history of a quarter of a century of independent power leaves little to recount beyond ever-recurring acts of violence, and the rapid and summary deposition of one president after another. In 1836 Texas secured its independence of the Mexican republic, for which it had struggled for several years; and at the same period differences arose with France, which were, however, brought to a peaceful conclusion after the taking of Vera Cruz 1838 by the French troops. In 1841 Gen. Santa Anna, on the retirement of Bustamente, succeeded in regaining the direction of affairs, from which he had been more than once deposed, and under the title Dictator exercised the power of an autocrat. In 1845 Mexico was compelled to recognize the independence of Texas, which was incorporated with the United States, whose troops having entered the Mexican territory, provoked a declaration of war by the Mexican government. Hostilities were carried on with great energy by both parties until 1848, when peace was concluded, after several bloody engagements, and after the city of Mexico had been stormed and taken by the Americans under Gen. Scott. (See MEXICAN WAR.) In 1852, after Santa Anna and Herrera had been in turn deposed and recalled to power, a revolutionary movement of more than ordinary importance brought Gen. Ceballos for a time to the head of affairs; but when the insubordination and arrogance of the soldiery threatened universal anarchy, Santa Anna was again recalled, 1853, Mar. 17. Having reorganized the army, and suppressed by the most cruel severity the insurrection of the federals, he declared himself president for life, and thus again rekindled civil war. In 1855 he had to flee from the country. Until 1867, confusion prevailed. Santa Anna was succeeded by Gen. Alvarez, who held office about two months, after whom came Gen. Comonfort, who was forced to resign 1858, when Gen. Zuloago assumed supreme power, but was almost immediately deposed by Gen. Robles. This person also proving a futility, Benito Juarez (q.v.) was elected; but his claims were contested by Gen. Miramon—head of the priestly and conservative party—and the country was again plunged into civil war. The acts of wanton aggres-

sion and flagrant injustice perpetuated on foreigners in Mexico during this period of internal disorder, during which the congress passed an act suspending all payments to foreigners for two years, could not fail to draw upon the Mexican government the serious remonstrance of those European powers whose subjects had just cause of complaint, and the result was to bring a fleet of English, French, and Spanish ships into the Mexican Gulf to enforce satisfaction. 1861, Dec., the British minister left Mexico, and the Spaniards disembarked a force at Vera Cruz, and took possession of the fort of San Juan de Ulloa, a step which was soon followed by the arrival before the former city of the allied fleet. A proclamation signed by the commanders-in-chief of the three naval divisions, and addressed by them to the Mexican people, elicited no satisfactory reply; and steps were accordingly taken to advance at once upon the capital. This measure alarmed the provisional government of Mexico, and brought about an armistice, with a view of negotiating a treaty for future regulation of commercial intercourse between Mexico and the great European powers. This treaty was drawn up and provisionally ratified by the different commanders, but not confirmed on the part of France, and consequently the French troops retained occupation of the Mexican territory after the English and Spaniards had declined to join in further hostile demonstrations, 1862, Apr., the French emperor formally declared war against the government of Juarez, who had assumed arbitrary rule as president of the republic.

After the declaration of war by the French, they issued a proclamation to the Mexican people, 1862, Apr. 16, setting forth that one of the objects of the contest was to rescue them from the tyranny of their president, and put the government of the country on a stable footing. Little faith, however, seems to have been put in these professions; and the invaders, though joined by Marquez, military leader of the clerical party, met little success till the arrival of Gen. Forey in September, with a reinforcement from France. Forey then took the command-in-chief, addressed a proclamation to the Mexicans, promising them perfect liberty in the choice of a new government in place of that of Juarez; and in the spring of 1863, concentrated the French troops, and marched on the city of Mexico. On his way, he took the strongly fortified city of Puebla after a two months' siege, capturing its defender, Ortega, and his whole force (May 18); and, Juarez having fled from the capital, and transferred the seat of his government to San Luis Potosi at their approach, the French entered Mexico, June 10. A fortnight afterward, a provisional government, headed by Gen. Almonte, was established, and an 'Assembly of Notables,' which was called (June 21) to deliberate upon the best form of government, decided in July, by a vote of 231 to 19, in favor of a 'Limited Hereditary Mon-

archy,' with a Roman Catholic prince for sovereign, under the title 'Emperor of Mexico,' and resolved in the first place to offer the crown to the archduke Ferdinand *Maximilian* (q.v.) of Austria; failing whom, to request the good offices of Emperor Napoleon III. in obtaining another monarch. That this resolution was the fruit of a general earnest wish on the part of the Mexican notables, the feeble and almost unwilling support that most of them accorded to their chosen emperor after his desertion by the French renders utterly improbable; but, on the other hand, there is no evidence that anything approaching intimidation or undue influence was exercised by the French. Most of the Mexican notables doubtless argued that a government supported by France would be sufficiently powerful to maintain the country in tranquillity, and in the hope of this long-wished-for result, cast in their lot for empire. These changes were, of course, vigorously protested against by the republican assembly at San Luis, and the two parties prepared with eagerness to try the fortune of war. Oct. 1, Forey departed from Mexico, and Gen. Bazaine took the command of the French forces, and began the campaign with vigor. The result of the winter's struggle was that in spring the imperialists were in possession of the whole country, with the exception of the four northern provinces. 1863, Oct. 3, Archduke Maximilian had given audience at his château of Miramar, near Trieste, Austria, to a deputation sent to offer him the crown, and had accepted it. 1864, May 29, the emperor and empress landed at Vera Cruz, and, June 12, made their public entry into the capital; and soon after the middle of the year, the imperialists had gained possession of every state in the kingdom, Juarez retreating northward and finally establishing the republican government at El Paso del Norte, now known by the name of Ciudad Juarez. As small parties of the republicans still maintained a guerilla warfare in various districts, Maximilian, 1865, Oct. 2, published a proclamation, menacing with death, according to the laws of war, all who were found in armed opposition to his government; the republic having ceased, not only by the express wish of the nation, but also by the expiry (1864, Nov. 22) of Juarez's term of office, and his flight beyond the frontiers; an amnesty, however, being accorded to such as submitted before Nov. 15. In accordance with this edict, Generals Arteaga and Salazar, who were defeated and captured Oct. 13, were shot on the 21st; and many hundreds of captured republicans were dealt with under the terms of the same severe order.

This contest in Mexico had from the commencement excited the liveliest interest in the United States, though the war of secession, then raging there, prevented any active interference in the affairs of the neighboring state. A general impression existed that France had taken advantage of the troubles of the United States to establish

its authority firmly on the American continent; and this belief, with the violation of the 'Monroe doctrine' by the establishment of imperialism in Mexico, induced the United States to give all their sympathy and diplomatic aid to Juarez and his supporters. 1865, Nov. 6, Sec. Seward forwarded a dispatch to Paris, in which it was stated that the presence of the French army in Mexico was a source of 'grave reflection' to the U. S. government, and that the latter could on no account allow the establishment of an imperial government, based on foreign aid, in Mexico, or recognize in that country other than republican institutions. This dispatch led to an interchange of diplomatic notes during the following six months; the Americans holding firmly to their first statement, and even intimating the probability of an armed interference on behalf of Juarez; till the French emperor, who was wearied with a contest so expensive and, though successful, so barren of lasting fruits, ultimately agreed, in the summer of 1866, to withdraw his troops from Mexico, having expended there about $40,000,000 The Belgian legion and some Austrian levies, however, were not included in this arrangement. Accordingly, from the autumn of 1866 till 1867, Feb., the French troops by degrees evacuated Mexico; there was a fresh rising of the Juarists, and constant gains were made by them. See MAXIMILIAN; JUAREZ.

May 15 the emperor was captured; he was tried, condemned, and, June 19, was shot, with his two generals, Miramon and Mejia. July 15 Juarez re-entered the capital, and, Oct., was re-elected president. Several insurrections followed in 1868-9, of which the most formidable was that of Angel Santa Anna, who was captured after 4 months, and with his followers was shot. 1871 Juarez was again elected, his competitors being Porfirio Diaz and Lerdo de Tejada; he died 1872, July 18. He was the first president who had held his office during an entire term; and he succeeded in his work of reconstruction so far as to insure something like a stable government for Mexico. He was succeeded by Don Sebastian Lerdo de Tejada, who had been minister of foreign affairs under Juarez, and was a skilled diplomat, and who maintained the affairs of the republic in a satisfactory condition. But his re-election, 1876, was followed by a revolution, headed by Gen. Porfirio Diaz, who drove out Lerdo de Tejada and his cabinet, and took control of the government. He succeeded in restoring the country to order and quiet. At the election, 1880, Gen. Manuel Gonzales was declared president. Under him the finances were brought into a very disordered state; and in 1884 Gen. Diaz was again elected to the presidency. He has since been re-elected at each national election and is still president. He is a strong and skilful ruler, and has the personal confidence of the country as an upright and patriotic man. There have been a few revolutionary outbreaks

during his administration, but he has promptly and vigorously suppressed them.

In 1905, July 1, President Diaz by proclamation abolished the *Libra Zone* or Free Zone, established about 1851, after Mexico had lost Texas, to encourage settlement and population on the Mexican border, by securing for the inhabitants cheap necessaries of life and as an incentive to the establishment of new industries. Extended at various times, the Free Zone, at the time of its abolition about 12 miles in width, stretched from the Gulf of Mexico along the valley of the Rio Grande and the New Mexico and Arizona frontiers to Tijuila on the coast of Lower California. At first all goods from foreign countries were imported into the territory free of duty, but later 11 per cent. of the full duties were required to be paid. The abolition of the Free Zone and the unification of duties were advantageous both to Mexican merchants in the interior and U. S. frontier merchants, the Zone, despite the best vigilance, offering too many opportunities for smuggling into Mexico, and back into the U. S.

The present general condition and prospects of Mexico are very good; peace and order are established, and the republic seems more firm than ever before. See Prescott, *Conquest of Mexico; Historia de Mexico;* Alaman and Brocklehurst, *Mexico To-day* (1883); Romero, *Mexico and the United States* (1898); Moses, *Constitution of the United States of Mexico* (1899); Salinas, *The Riches of Mexico and Its Institutions* (1893); Cubas, *Mexico: Its Trade, Industries and Resources* (1893); Chevalier, *Mexico, Ancient and Modern* (1864); Noll, *Short History of Mexico* (1890); *From Empire to Republic* (1903); Hale, *The Story of Mexico* (1891); Sierra and others, *Mexico: Its Social Evolution* (1904); etc.

MEX'ICO, or MEJICO: city, capital formerly of the Spanish colony of New Spain, present capital of the republic of Mexico: situated in the Federal District; 19° 20′ n. lat., 99° 5′ w. long.; nearly 7,500 ft. above sea-level, in the valley of Mexico, 2½ m. w. of Lake Texcoco; 292 m. by rail from Vera Cruz, on the Gulf of Mexico, 290 m. from Acapulco, on the Pacific, 863 m. from Matamoras, on the United States boundary. Pop. (1900) 344,-721. This beautiful city is built on the site of the ancient Tenochtitlan, capital of the Aztec confederacy, on an extensive plateau of 1,400 sq.m., surrounded by lofty mountains and including five lakes. The principal streets of the city are regularly and well laid out, broad, clean, and well paved and lighted; but the buildings, both private and public, are low and of light architecture, in consequence of water being found in many parts of the city at only a few feet below the surface, and partly from apprehension of earthquakes. The Plaza Mayor, one of the finest squares in the western world, is bordered on one side by the cathedral, the largest and costliest church in

America, erected on the ruins of the great *teocalli*, or temple of the god Huitzilopochtli, titular god of the Aztecs. The cathedral, founded 1573, finished 1657, whose walls alone cost $2,000,000, is in form a Greek cross, 426 ft. long, 203 ft. wide: it has two naves, 20 side chapels, a sumptuous high altar, and an elaborately carved choir whose balustrade of rich metal is valued at $1,500,000. The interior is Doric, exterior Renaissance: its two open towers are 218 ft. high. Mexico has one of the finest collections of pictures in America, a national library of more than 100,000 volumes, with priceless literary treasures, and a mint which since 1690 has issued coinage, chiefly silver, to the amount of more than $2,000,000,000. The national palace, bordering the same square as the cathedral, consists of various buildings appropriated to offices of government. Mexico City contains many Roman Catholic and several Protestant churches and numerous charitable and correctional institutions; its penitentiary is a model in its class. There are schools of jurisprudence, medicine, agriculture, engineering, and an academy of the fine arts; there are several theaters and a circus. Its national museum is rich in all lines of science, in relics of national history, and in Aztec antiquities. In addition to the ordinary *alameda* or public walk of a Spanish city, Mexico City is remarkable for the extent and beauty of its *paseos*, or raised paved roads, planted with double rows of trees, which diverge far into the country from every quarter of the city. There are still many floating-gardens, or *chinampas*, for which the ancient city was celebrated; and, though they probably never floated, they form attractive objects in the midst of the surrounding swamps, which have now been scientifically drained. The trade is chiefly a transit-trade, though there are a few manufactures—e.g., cigars of superior quality, gold-lace, hats, carriages, saddlery, etc.; and these articles, together with gold and silver, and some of the numerous valuable natural products of the Mexican plain, are transported to Vera Cruz and other ports: in return the manufactured goods of Europe.

During the past 10 years the development of Mexico has been phenomenal. In 1880 there was only one railroad in the country—that from Vera Cruz to Mexico (292 m.)—and the great bulk of transportation was by mules. Gen. Grant's interest in the country and city did much to attract capital to both; and 1887 there were 4,000 m. of railroad completed and many more under construction. American, English, German, and some Spanish capital has been applied to the development of the vast natural resources of the country, and the enlargement of means of communication; at present the city is connected with the ports and chief towns in the country by the Mexican Central, National, and Mexican railroads. The valley of Mexico, surrounding the capital, is now

drained by a magnificent series of drainage works comprising nearly 37 m. of canal and tunnel; this work, completed in 1898, cost $20,000,000. The city has also an excellent system of modern sewerage, which was undertaken upon the completion of the drainage canal.

MEXICO, Mo.: city, county-seat of Audrain county; on Salt River, and on the Wabash and the Chicago & Alton R.R.'s; about 115 miles northwest of Saint Louis. Mexico was settled in 1833 and in 1852 was incorporated. It is an agricultural section, the chief products of which are wheat and corn. The manufactures are dressed marble, wagons, plows, flour, stove lining, fire-brick, and foundry products. Mexico is the seat of the Missouri Military Academy, and of the Hardin College for Women, founded in 1873. The charter under which the government is administered was granted in 1893, and provided for a mayor, who holds office for two years, and a council. Pop. (1900) 5,099; (1910) 5,939.

MEX'ICO, Gulf of: basin of the Atlantic Ocean, about 800 m. in greatest width from n. to s., and about 1,100 m in greatest length westward from the s. point of Florida; estimated area 800,000 English sq.m.; closed in by the United States on the n., by Mexico on the w. and s. Its outlet on the e. is narrowed by the jutting peninsulas of Florida and Yucatan, which approach within 500 m. of each other. In the middle of this entrance is the island of Cuba, dividing the strait into two—the Strait of Florida, 120 m. wide, between Cuba and Florida, and the Strait of Yucatan, 105 m. wide, between Cuba and Yucatan. The former or n. entrance connects the gulf with the Atlantic Ocean; the latter, or s., with the Caribbean Sea. The depth of water is supposed nowhere to exceed three-fourths of a mile, yet the gulf contains few islands—the Florida Keys, the deltas of the Mississippi, and a few on the coast of Yucatan, being the most important. The shores, which are very sinuous, form numerous bays, the largest of which is the Bay of Campeachy (q.v.). The coasts are mostly low and sandy or marshy, and are lined with numerous lagoons; good harbors are consequently not numerous, the best being those of Vera Cruz, New Orleans, Pensacola, and Havana. The gulf is visited by violent northern gales called *nortes*, which prevail after Sep., attaining their maximum force in Mar., and then immediately terminating. The most remarkable feature in connection with the Gulf of Mexico is the *Gulf Stream* (q.v.), which enters it by the s. channel, passes round it, and emerges through the Strait of Florida. Owing partly to the presence of this heated current, the temperature of the gulf is 8° or 9° higher than that of the Atlantic in the same latitude.

MEYER, *mī'ėr*, George von Lengerke: diplomat; b. Boston, 1858, June 24. He graduated from Harvard Univ. in 1879, and while actively engaged in commercial

pursuits as director of several New England manufacturing enterprises, became prominent in civic affairs; was a member of the Massachusetts legislature, 1892-96; speaker of the house, 1894-96; chairman of the Mass. board of managers for the Paris Exposition; and in 1899 was elected member of the Republican National Committee. He was appointed ambassador to Italy in 1900; in 1905 succeeded Charlemagne Tower as ambassador to Russia, and became postmaster-general of the United States, 1907, Mar. 4.

MEYER, Heinrich August Wilhelm, Th.D.: 1800, Jan. 10—1873, June 21; b. Gotha. He was educated at the gymnasium at Gotha, and graduated from the Univ. of Jena 1820. In 1823 he became pastor of a church at Osthausen. In 1829 he published the first part of his great critical and exegetical commentary on the New Testament; the second part appeared 1832; and to the end of his life he was engaged on this great work, which was to have been completed in 16 divisions, but was not completed by him. New editions of the separate volumes were continually called for during his life, and he was kept busy revising and rewriting them from year to year. From the first his commentary was recognized, as it still is, as the most thorough, scholarly, and trustworthy work of the kind in existence. His method is the grammatico-historical, acutely critical, yet evangelical in spirit. An English translation of the commentary has been published in Edinburgh, edited by Drs. W. P. Dickson, of the Univ. of Glasgow, and F. Crombie, of St. Mary's College. Recently an American edition, edited by a number of leading biblical scholars, has been published. In its particular field, Meyer's work is still without a rival. In 1830 he published his valuable *Libri symbolici Ecclesiæ Lutheranæ*. He continued active as a pastor and superintendent, preaching regularly, until 1848; became general superintendent at Hanover 1861; and retired from official life in impaired health 1865, though still residing at Hanover, where he died.

MEY'ER, Johann George (known as Meyer von Bremen): 1813, Oct. 28—1886, Dec. 4; b. Bremen. Studied art at Düsseldorf, 1833-42; and opened a studio there, where he began painting religious subjects on a large scale. He soon changed his style to that in which all the works on which his fame rests have been executed. Filled with the spirit of Meissonier, he began that series of domestic subjects, with studies of children, on diminutive canvas, conceived with tenderest pathos, and executed in every minute detail with exquisite finish, which have made him famous and a general favorite not only in his own country, but also in England, France, and the United States. In 1852 he established himself in Berlin, and so great is the demand for his pictures, popular in theme, small in size, rich in color, and perfectly finished, adapting them peculiarly for home adornment and as parlor

pictures, that they are usually sold to private purchasers before they can be secured for the great exhibitions. Many of his best pictures have been engraved and have become familiar to the public. Such are *The Widow's Evening Prayer with Her Children, The Return of the Soldier of the Landwehr, The Very Small Brother, The First Prayer,* and others. The first and third of these were exhibited at the Paris exposition of 1855. Many of his paintings are owned in the United States.

MEYER, JOSEPH: German publisher: b. Gotha, 1796, May 9; d. 1856, June 27. He organized various industrial undertakings, founded a publishing business at Gotha, which soon attained large proportions, was removed by him to Hildburghausen (1828), and in 1874 was transferred to Leipsic. The best known of his publications is the *Meyers Konversationslexikon,* the rival of Brockhaus in the encyclopædia field, which has been brought down to date by constant revisions and supplements. He published also a series of the German classics, a *Historical Library,* and a *Library of Natural Philosophy.*

MEYER, KLAUS: German painter: b. Linden, Hanover, 1856, Nov. 20. He entered the Art School at Nuremberg in 1875, studied there 12 months, and subsequently became a pupil of Wagner and Lofftz at Munich. The result of their teaching, added to a patient study of the Dutch masters of the 17th century, appeared in the delicacy, vivid characterization and refined coloring of his work, which won him a place among the first of living Dutch painters. These qualities are exhibited in a Dutch interior produced by him (1882) in which are two figures in the costume of the 17th century. This work recalls the finest creations of Pieter de Hoogh and Van der Meer von Delft, although Meyer prefers an atmosphere of cool silver tone to the warm golden lights of those masters. Another interior, a Beguin monastery scene (1883) won for him the grand gold medal at the International Art Exhibition at Munich. He painted many pictures in a similar vein, such as *The Monastery School; The Singing Nuns; Old and Young Cats* (in the Dresden Gallery 1885); *The Spy,* an incident in the Franco-Prussian War; and *Lady Reading a Letter* (1892). In 1891 he was appointed instructor in the Art Academy at Carlsruhe, and 1895 professor in the Art Academy at Düsseldorf. At the Berlin Exhibition of that year he was awarded the grand gold medal.

MEYERBEER, *mī'ėr-bār,* GIACOMO (known in Germany first as JAKOB MEYER BEER): celebrated musical composer: 1791 (or 4), Sept. 5—1863, May 2; b. Berlin; son of a wealthy Jewish banker. He was a precocious child, playing tunes on the piano spontaneously (it is said) as early as his fifth year. He began to study dramatic composition under Bernhard Anselm Weber; and 1810 entered the school of Vogler at Darmstadt, where he

formed an intimate friendship with the renowned Karl Maria von Weber. While at Darmstadt, he wrote a cantata, *Gott und die Natur*. Subsequently, he composed an opera, *Jephthah*, produced at Munich 1812; but though warmly admired by his friends, Vogler, Weber, and others, it fell flat on the audience, and was considered a failure. He then went to Vienna, where he acquired brilliant reputation as a pianist; but another opera which he produced here by command of the court, *Die beiden Khalifen*, was no more successful than the previous one. Italian music was the rage at the time, and nobody had a chance who did not imitate Rossini. Meyerbeer was induced by his friend Salieri to visit Italy, where he became an enthusiastic convert to the new Italian school, and began the composition of a series of operas which proved highly popular. Among these are *Romilda e Constanza* (performed at Padua 1819), *Semiramide* (Turin 1819), *Emma di Resburgo* (Venice, 1820), the first of Meyerbeer's compositions that excited a furor; *Margherita d'Anjou* (1882), *Esule di Granada* (1823), and *Crociato* (Venice 1825). The last of these afforded, perhaps, the most decisive proofs of the high genius of its composer, and was received with great applause in Paris, whither Meyerbeer then went to reside. In 1831 was produced, after numerous rehearsals, his grand dramatic opera *Robert le Diable*, which caused an excitement 'perhaps unparalleled in the history of the Parisian stage;' while it was received with nearly as great enthusiasm in England, Italy, Austria, and Russia, and later in America; and 1836, *Les Huguenots*, in which Meyerbeer reached the climax of his fame. His next opera, *Le Prophète* (1849), fairly sustained his reputation. It was followed by *Pierre le Grand* (1854), *Dinorah* (1858), and *L'Africaine* (1865).

MEYNELL, *mī'nĕl*, Alice Thompson: English poet and essayist: b. London, England. She spent much of her childhood in Italy, and was married in 1877 to Wilfrid Meynell, a London journalist. She has published *Preludes*, a collection of poems (1875), illustrated by her sister, Lady Elizabeth Butler (q.v.); *Rhythm of Life* (1893); *The Color of Life* (1896); *The Children* (1896); *The Spirit of Place* (1898); *John Ruskin* (1900); *Later Poems* (1901); . *The Flower of the Mind: a General Anthology of English Poetry* (1897); *Children of the Italian Masters;* etc. Consult: Archer, *Poets of the Younger Generation* (1902).

MEZEN, or Mezene, *mĕz-ān':* district town in the govt. of Archangel, European Russia, 50 m. from the mouth of the river Mezen; remarkable for the salmon and herring fisheries which supply St. Petersburg with frozen fish during the winter. The river Mezen, or Mezene, rises in the n. of the govt. of Vologda, European Russia, and flows n.w. into the White Sea, having a course of about 450 miles.

MEZEREON, *mĕ-zē′rē-ŏn* [F. *mézéréon*]: flowering shrub whose extremely acrid bark has been used in medicine as a diaphoretic in cutaneous and syphilitic affections, though it is a powerful irritant, and is of doubtful advantage; the bark of the *Daphne mezērĕum*, ord. *Thymelācĕæ*. See DAPHNE.

MÉZIÈRES, *mā-zē-ār′:* fortified town of France, cap. of the dept. of Ardennes, on a bend of the Meuse, which washes its walls on two sides and separates it from Charleville (q.v.). It was strongly fortified by Vauban, and is defended by a citadel. It communicates with Charleville by a suspension-bridge. In 1815 the town held out for two months against the Allies, who besieged it after the battle of Waterloo. Over the n. aisle of the church is a bomb-shell, which has been sticking there ever since the town capitulated. In 1520 the Chevalier Bayard, with 2,000 men, successfully defended it against 40,000 Spaniards under Charles V. In the Franco-German war, 1871, Mézières capitulated after a cannonade of two days. Pop. 6,000.

MÉZIÈRES, ALFRED JEAN FRANÇOIS: French critic and politician: b. Rehon 1826, Nov. 19. He studied at the Ecole Normale and in Athens; was professor of literature at Nancy (1854-61), and at the Sorbonne; became an Academician in 1874; in politics is a member of the moderate Opportunists; and was deputy from 1881 to 1900, when he was elected senator for Meurthe-et-Moselle. Besides contributions to the *Revue des Deux Mondes* and *Temps* he wrote *Shakespeare* (1861); *Shakespeare's Predecessors and Contemporaries* (1863); *Shakespeare's Contemporaries and Successors* (1864); *Dante* (1865); *Petrarch* (1867); *Goethe* (1872-3); *In France* (1883); *Outside of France* (1883); *Mirabeau* (1891); *Dead and Living* (1898); etc.

MEZQUITE, *mĕs-kēt′*, Sp. *mĕs-kē′tā:* name of two Mexican trees or shrubs, of nat. order *Leguminosæ*, suborder *Papilionaceæ*, bearing pods filled with a nutritious pulp. The COMMON MEZQUITE (*Algarobia glandulosa*) is a small shrub, with stems often decumbent, and armed with strong straight spines. It is found in great profusion throughout vast regions, chiefly dry and elevated plains. In dry seasons, it exudes a great quantity of gum (*Gum Mezquite*), similar in quantity to gum-arabic, which seems likely to become a considerable article of commerce, and which has begun to be exported to San Francisco from the Mexican ports on the Pacific.—The CURLY MEZQUITE, or SCREW MEZQUITE (*Strombocarpa pubescens*), called also SCREW BEAN and TOURNIL, though only a shrub or small tree, is of great value in the wild and desert regions of western N. America, where it occurs with willow-bushes near springs of water. Its wood is used as fuel, and the pulp of its pods for food. The pods are spirally twisted into compact rigid cylinders, from an inch to an inch and a half in length.

MEZZANINE, n. *mĕdz′ă-nēn* [It. *mezzanīno*—from *mezzano*, middle]: a low intermediate story between two higher ones.

MEZZO, a. *mĕt′zō* [It. *mezzo*, middle—from L. *medĭŭs*, middle]: in *music*, middle; mean. MEZZA-FORTE, moderately loud. MEZZO-PIANO, rather soft. MEZZA-VOCE, with moderated force of tone. MEZZO-ORCHESTRA, with half the orchestra. *Mezzo* alone, applying to the grand pianoforte, calls for use of the pedal, avoiding one of the sets of strings. MEZZO-RELIEVO, n. *mĕt′zō-rā-lē′vō* [It.: see RELIEVO]: middle or demi relief. MEZZO-SOPRANO, n. *mĕt′zō-sō-prâ′nō*, a medium or half soprano: see SOPRANO; the female voice so called; the person having such a voice: ADJ. having a medium compass of voice, between the soprano and contralto, said of a female voice.

MEZZOFANTI, *mĕd-so-fân′tē* or *mĕt-so-fân′tē*, GIUSEPPE, Cardinal: remarkable linguist: 1774, Sep. 17—1849, Mar. 15; b. Bologna, where he received his education, and subsequently (1815) received the office of university librarian. In 1831 he settled in Rome, and was advanced to the dignity of a Monsignore; 1833 he was appointed sec. of the College of the Propaganda; then keeper of the Vatican Library; and 1838 he was raised to the dignity of cardinal. He died at Rome. M.'s European reputation was founded not on any literary or learned works that he wrote, but on the almost miraculous extent of his linguistic acquisitions. Toward the end of his life, he understood and spoke 58 different tongues. As early, indeed, as 1820, Lord Byron called him 'a walking polyglot, a monster of languages, and a Briareus of parts of speech.' He was not in the strict sense a critical or scientific scholar; yet, though his linguistic skill lay chiefly in verbal knowledge, his acquirements in other departments were considerable. See Russell's *Life of Cardinal Mezzofanti* (Lond. 1858).

MEZZOJUSO, *mĕt-sō-yô′sō* (Arab. *Menzîl-Jussu*, village of Joseph): town of Sicily, province of Palermo, 18 m. s.s.e. of Palermo city. It is one of the four colonies of Albanians, who, on the death of Scanderbeg, 15th c., fled to Sicily, to avoid the oppression of the Turks. They preserve their language to a great extent, and in religious observance follow the Greek ritual, their priests being allowed to marry; but, except on fête-days, they are not distinguishable in feature or dress from the peasantry of the rest of Sicily. Pop. 6,700.

MEZZOTINT, n. *mĕz′zō-tĭnt* or *mĕt′zō-tĭnt*, or MEZ′ZO-TIN′TO, n. *-tĭn′tō* [It. *mezzotinto*—from *mezzo*, middle, half; *tinto*, tint—from L. *tinctus*, dyed, tinged]: style of engraving on copper in imitation of Indian ink (see ENGRAVING): a certain style of drawing.

MGLIN, *mglēn:* town of Russia, govt. of Tchernigov, 125 m. n.n.e. of the town of Tchernigov. There is a large cloth-factory, and a considerable number of German families. Pop. 7,000.

MHENDIGUNJ′: town of British India, territory of Oude, 90 m. s.e. of Lucknow, 3 m. s. of the right bank of the river Sace. It is a busy, thriving place. Pop. estimated 20,000.

MHOW, *mhow:* town of British India, territory of Indore, 13 m. s.w. of the town of Indore, near the Vindhyan Mountains, on an eminence on the Gumber river. Near it are the cantonments, which have altogether the appearance of a European town, having, on an eminence, a church with steeple, a spacious lecture-room, a well-furnished library, and a theatre. They are 2,019 ft. above sea-level. Pop. of M. 36,000.

MI, *mē* [It. and F.]: in *music*, the third note of the scale = E.

MIAGAO, *mē-â′gô-ō:* town in the island of Panay, one of the Philippine Isles, province of Iloilo. The inhabitants are industrious, comfortable, and well educated. Pop. (1899) 22,100.

MIAKO, *mē-â′ko*, or SAI-KIYO, *sī-kē′yo:* ancient cap. of Japan: see KIOTO.

MIAMI, *mī-âm′ĭ* or *mē-ăm′ē*, RIVER: stream in Ohio, rising by several branches in the w. centre of the state, and after a s.s.w. course of 150 m. through one of the richest regions of America, past the important cities of Dayton and Hamilton, empties into the Ohio river, 20 m. w. of Cincinnati. It is sometimes called Great M., to distinguish it from Little M., a smaller river, which runs parallel to it, 15 to 25 m. e., through the Miami Valley.

MIAM′IS: tribe of Algonquin Indians whom the French met near Green Bay, Wis., 1658. About 8,000 of them also were found, 1670, at the head of the Fox r., living in a palisaded village, in houses of matting, and displaying higher character and social relations than usual among the northern tribes. In 1683 they were attacked by the Iroquois, on the St. Joseph r., and at the same time were at war with the Sioux. In 1686 they came into collision with the French, and finally made agreement with the English, joining the Iroquois against the Hurons, and threatening the Chippewas. In 1705 the French involved them in a war with the Ottawas. At the outbreak of the French and Indian war, they hesitated which side to join, but on the whole favored the English, and, 1751, were attacked by the French. Afterward they joined Pontiac, and took the British forts Miami and St. Joseph's. During the Revolution they sided with the English, but were forced to make peace by Clarke; but a hostile attitude against the encroaching settlers was maintained, until, 1790, Gen. Harmar was sent against them. Under Little Turtle their 1,500 warriors defeated Gen. Hardin twice, also Gen. St. Clair;

Gen. Wayne, however, routed them, 1794, Aug. 20, at Maumee rapids; and, 1795, peace was concluded. They ceded their lands after this, and rapidly declined in character and numbers. They joined in Tecumseh's movement, but were defeated, and made peace 1815, Sep. 8. After various cessions of land and treaties, they were, 1846, removed to the Ft. Leavenworth, Kan., reservation. In 1873 only about 150 of them remained, who were removed to the Quapaw reservation.

MIANTONO'MOH: Indian sachem of the Narragansett tribe, successor, 1636, of his uncle Canonicus. He was friendly with the early colonists of Mass., and on their side in the Pequot war. But later (1642) he attacked the Mohegan sachem Uncas, who captured him at Norwich, Conn. Uncas submitted his case to the commissioners of the colonies, who decided that M. had shown himself a dangerous public enemy; whereupon Uncas's band tomahawked him, on the plain, since called Sachem's Plain, now marked by a monument erected 1841.

MIASKITE, or MIASCITE, n. *mĕ-ăs'kīt* [*Miask*, in Siberia]: a granite rock, consisting of cleavable white felspar, black mica, and grayish or yellowish-white elæolite with some hornblende.

MIASMA, n. *mĭ-ăz'mă*, or MIASM, n. *mĭ-ăzm'* [Gr. *miasma*, defilement—from *miainein*, to stain, to pollute: It. *miasma:* F. *miasme*]: noxious exhalation floating in the air, arising from decaying, diseased, or poisonous substances: often in the plural MIASMATA, *mĭ-ăz'mă-tă*, malaria. MIAS'MAL, a. *-măl*, containing miasma. MIASMATIC, a. *mī-ăz-măt'ĭk*, pertaining to miasma, or containing it.—*Miasma* is often popularly identified with MALARIA, though malaria refers rather to the *air* as tainted with noxious effluvia. A familiar form of Miasma is the poisonous exhalation arising from marshes. It is proved by the experience of all ages that there is intimate connection between marshy districts and certain diseases, especially the various forms of intermittent and remittent fever; but the exact nature of the noxious agent, and the circumstances on which its formation and extrication depend, are not fully known. M. is clearly neither heat nor moisture; for the crews of clean ships cruising in the tropics, at a distance from land, are usually very healthy; nor is it any known gas extricated from the marsh, for the gases collected by stirring up marshes (carbonic acid, nitrogen, oxygen, and carburetted hydrogen) may be inspired without giving rise to any malarial symptoms. It may be regarded as established that the noxious agent is a product of vegetable decomposition under certain conditions of heat and moisture. This is inferred from the fact that this special morbific influence is nowhere so powerful as in the deltas and along the banks of large tropical rivers, which, in their flood, bring down the washings of the soil, full of vegetable remains, which, by the subsidence of the waters,

are left reeking in the hot sun. Moreover, the poison has been traced, in various places in Italy, France, and the Netherlands, to the practice of steeping flax in stagnant waters, and even in streams; and in India, it was formerly the custom, after extracting the coloring matter from indigo, to throw the remains of the plant into large heaps, which, in the course of three years, became excellent manure: it was found, however, that these heaps, alternately soaked by the heavy rains and heated by a tropical sun, decomposed and emitted miasmata precisely similar in their effects to those produced by marshes. Marsh-miasmata are seldom evolved at a temperature under 60°, but at and above 80° they are prevalent and severe; and the nearer the equator, the more violent, as a general rule, do they become. Although moisture is necessary to the evolution of miasmata, an excess of it often acts as a preventive, and by impeding the access of atmospheric air, retards or prevents decomposition. This explains the apparent anomaly of an uncommonly rainy season producing opposite effects in different localities, sometimes not distant from one another. Thus, in the W. Indies, a very rainy season induces general sickness in the dry and well-cleared island of Barbadoes; while at Trinidad, whose central portions are 'a sea of swamp,' and where it rains nine months in the year, the excessive rain is a preservative from sickness; for in the seasons when rain falls only eight months or less, the swamps become dry and exposed to the sun, and severe remittent fevers are sure to follow.

Chemistry has hitherto failed in detecting any special ingredient to which the air evolved by marshes owes its poisonous qualities. The air collected in the most poisonous districts gives, on analysis, the same gases existing in the same proportions as normal air; nor (if we except the observations of Boussingault, not yet confirmed by other chemists) does it give evidence of the presence of any organic body.

The infecting distance of this poison is a subject of great practical importance; and both the altitudinal range and the horizontal spread have to be noticed. In Italy, it is estimated that an altitude of about 1,500 ft. assures exemption from marsh-poison; while in the W. Indies an elevation of at least 2,000 ft. is necessary. From observations by Sir Gilbert Blane, during the ill-fated Walcheren expedition, it appears that, in Europe, the horizontal spread of marsh-miasmata over fresh water is less than 3,000 ft.; but over salt water—at all events, in the tropics—the horizontal range is greater. The extent to which the poison may spread horizontally over land is a much more complicated question, and depends largely on the nature of the soil. The effect of trees in intercepting miasmata is remarkable, and is probably due partly to their condensing the vapors of the marsh, and partly to their altering the direction of the current of air. Pope Benedict XIV. caused a forest to be cut down which separated Villatri from the Pontine Marshes, and in con-

sequence, for many years, there was a most severe and fatal fever in a district previously healthful; and the same results have in many other cases followed the removal of trees.

In districts where this poison exists, it is found by experience that those who go out of their houses only during the day, after the morning fogs have dispersed, and before the evening mists appear, often escape the bad effects; and a full meal, with a few grains of quinine, before exposure to the morning air is found protective by travellers in a malarious district.

Dr. Wood of Philadelphia has pointed out the extraordinary and very important fact, that miasmata are usually neutralized, decomposed, or in some other way rendered innocuous by the air of large cities. Though miasmatic diseases may rage around a city, and even invade the outskirts, yet they are unable to penetrate into the interior, and individuals who never leave the thickly-built parts almost always escape. What in the air of the city is thus incompatible with the miasmatic effect of marshes, is unknown; but probably the protection is connected with the results of combustion, for the fire and smoke of camps are asserted to have had the same effects.—See ENDEMIC.

MIAUL, v. *mē-owl′* [an imitative word: F. *miauler*, to mew as a cat: It. *miagolio*, the caterwauling of a cat]: to cry or caterwaul as a cat. MIAULING, imp. *mē-owl-ĭng*, crying as a cat: *n.*, the cries or crying of a cat. MIAULED, pp. *mē-owld′*.

MIAUTSÉ, *mē-ow-tsā′:* tribe of the aborigines or hill-tribes of China. From the dawn of Chinese history, we find the people of the plains contending against those of the high lands, and to the present day many of the hardy mountaineers have maintained practical independence. They consist of numerous uncivilized tribes, occupying large mountainous portions of Kwang-se, Kwei-chow, Yunnan, Sze-chuen, and adjacent provinces. Some of them own Chinese sway; but over many portions of them no real jurisdiction is ever attempted by the Chinese govt., which contents itself with a shadowy claim of sovereignty: these govern themselves on a patriarchal system. The M. are smaller than the Chinese, and unlike in features as in character. Their dialects are various, and wholly different from the Chinese. The M. of w. China are of the same stock as the Shans and Karens of Siam and Burmah.

MIAVA, *mē-ŏh′vŏh:* market-town of n.w. Hungary, on the Miava, an affluent of the Morava, 48 m. e.n.e. of Presburg city. There are manufactures of woolen cloth and bagging, and hemp and flax are cultivated. Pop. about 11,000.

MICA, n. *mī′kă* [Sp. and F. *mica*—from L. *micārĕ*, to sparkle, to glitter]: a mineral, called also *Muscovy Glass*, consisting essentially of a silicate of alumina, with which are combined small proportions of silicates of potash, soda, lithia, oxide of iron, oxide of manganese, etc. By these and slight external differences, mineralogists have distinguished numerous species. MUSCOVITE, or COMMON M., also called POTASH M., contains a notable but variable proportion of silicate of potash; also a little fluorine. It is a widely diffused and plentiful mineral, entering largely into the composition of granite, mica-slate, and some other rocks, veins and fissures of which it also often fills. It has a strong, often almost metallic lustre. It is remarkable for the readiness with which it splits into thin elastic plates, generally transparent, or at least translucent. The thinness and elasticity of these plates readily distinguish them from those of talc, and of the laminated variety of gypsum; also they are devoid of the greasy feel of talc. They are sometimes not more than one-300,000th of an inch in thickness, are mostly quite transparent, and were formerly much used in setting objects for the microscope; but for this purpose thin glass is now generally preferred. Plates of M., often a yard across, are found at the M. quarries at Acworth, N. H., also near Lake Baikal in Siberia, and in China. They occur of large size also in Sweden and in Norway; and the mineral is found in large masses in St. Dennis and other parts of Cornwall, England. In Siberia, China, Peru, and elsewhere, M. is substituted for glass in windows. At one time it was used for this purpose in the Russian navy, not being liable, like glass, to be broken at the discharge of cannon. It is sometimes preferred to glass for lanterns, and especially for the fronts of stoves, as not liable to break with sudden change of temperature. It is useful also for the mounts of natural history objects which are to be put in spirit, being more easily bored than glass. In India, small pictures are frequently painted in distemper on mica. Muscovite is usually colorless or of pale amber tint, but it occurs also white, gray, brown, green, dark olive, and, rarely, rose-red. It is found sometimes in beautiful crystals, generally rhombic or in six-sided tables.—LITHIA M., or LEPIDOLITE, occurs massive in a scaly-granular form at Rozena in Moravia, of fine purple or reddish-violet color. This is a very beautiful mineral, and, like jasper, lapis-lazuli, etc., is made into ornaments. That found in Great Britain is not of such delicate color as that found in Moravia.—MAGNESIA M., or BIOTITE, contains about as much magnesia as alumina. It is often dark green. MICACEOUS, a. *mĭ-kā′shŭs*, pertaining to or containing mica. MICA′-CEO-CALCA′REOUS, *mī-kā′shĭ-ō-*, partaking of the nature of, or consisting of, mica and lime, applied to mica-schist (q.v.) containing carbonate of lime.

MICADO, n. *mĭ-kā′dō:* see MIKADO: TYCOON.

MICAH, *mī'ka:* sixth (third in the LXX.) of the 12 minor prophets of Israel; b. probably at Moresheth, near Gath, in Judah. He prophesied mostly in Jerusalem, during the reigns of Jotham, Ahaz, and Hezekiah (B.C. 722—prob. B.C. 711), and was therefore contemporary with Isaiah, and Hosea, and Amos. — His prophecy forms the BOOK OF MICAH, a canonical work of the O. Test.; divisible into three parts, each commencing 'Hear ye;' organically connected, however, with each other, and showing even a progressive development of idea in the mind of the writer. The natural divisions are: i. 2—iii. 1; iii. 1—vi. 1; vi. 1—vii. 20. The destruction of Samaria (Israel), the danger and subsequent captivity of Judah, the wickedness of the rulers, the punishments that overtake the land, the glorious restoration of the theocracy, Jehovah's 'controversy with his people' on account of their sins, his warnings, his exhortations, and his sublime promise of forgiveness, form the principal points of M.'s prophecies, which relate to the invasions by Shalmaneser, Sennacherib, the Babylonian exile, the return, and the re-establishment of the theocracy under Zerubbabel. Through the nearer cycle of predicted events, the prophet gives distant visions of the Messiah: the announcement that Bethlehem should be the place whence Messiah should come has always commanded attention (Mic. v. 1–15; comp. Matt. ii. 5, 6; Jn. vii. 42). The style of Micah is clear, vivid, concise, yet richly poetical; some passages, especially in the beginning and the last two chapters, are among the noblest in the Old Testament. The play upon words, noticeable in Isaiah, is a marked feature of this writer also.

MI'CA-SCHIST: next to gneiss, one of the most abundant of the Metamorphic Rocks (q.v.). It consists of alternate layers of mica and quartz, but is sometimes composed almost entirely of the thin and shining plates or scales of mica, and from this it passes by insensible gradations into clay-slate. The quartz occurs pure in thin layers like vein-quartz. Garnets are in some districts abundant in this rock, making up a large proportion of the whole mass. M.-S. is believed to be a highly altered shale or clay deposit, and the component minerals, including the garnets, to have been developed under the influence of metamorphic action from materials already existing in the unaltered strata. In many places, the M.-S. has a finely corrugated or wavy structure.

MI'CA-SLATE: a metamorphic rock, widely distributed, composed principally of mica and quartz, but sometimes containing felspar. It resembles Mica-Schist (q.v.) in some respects, and clay-slate in others, but is not usually classed with either. It contains a larger proportion of clay than the former, and the mica appears in smaller particles; in some specimens the mica can scarcely be detected without a glass. The rock usually presents a foliated appearance. Hydromica schist, or slate, con-

tains hydrous mica with a small proportion of quartz. To the sense of touch it is like Talc (q.v.), and was formerly called talcose slate, but has been found entirely devoid of talc.

MICE, *mīs:* plu. of MOUSE, which see.

MĪCH, or MICHE, v. *mĭch* [Swiss *mauchen*, to conceal: F. *musser;* prov. F. *mucher;* OF. *mucer*, to hide, to skulk]: in *OE.*, to skulk; to lie hid out of view. MICH'ING, imp. MICHED, pp. *mĭcht.* MICH'ER, n. *-ẽr*, one who.

MICHAEL, n. *mī'kĕl:* a fine variety of sweet oranges, from the island of St. Michael, one of the Azores.

MI'CHAEL (or MIKAIL) FEODOROVITCH (ROMANOFF): see ROMANOFF.

MI'CHAEL VIII., surnamed PALÆOLOGUS, Emperor of Constantinople: see PALÆOLOGUS.

MICHAEL, *mī'kā-ĕl* or *mī'kĕl*, THE ARCHANGEL: the only archangel, or prince of the angels, named in the Bible; though post-exilian Jewish and popular Christian angelology have added others, to the number of seven, creating thus the highest order in the angelic hierarchy (see ANGEL: ARCHANGEL). M. is referred to in Dan. x. 13, 21; xii. 1; Jude 9; Rev. xii. 7. The Rabbinical traditions practically identifying M. with the Messiah are purely conjectural; though some Christian scholars have found reason for such conjecture in the Scriptural representation of M. as the great prince and leader of Israel. M. appears indeed as the type and leader of the children of God in their antagonism to heathen power, and their continual strife against Satan and his hosts—the great military leader who stands up with them and fights for them in the power of God. His contention with the devil about the body of Moses (Jude 9) seems an allusion to the Jewish tradition that, when M. was sent to care lovingly for Moses's body (see Deut. xxxiv. 6), he was withstood by the devil, who claimed it because the blood of the Egyptian (Ex. ii. 12) was on Moses's hands. (Cognate is Zech. iii. 1.)—M. is one of the saints in the Rom. Cath. calendar, and in that of the Prot. Episc. Church: see MICHAELMAS DAY.

MI'CHAEL-AN'GELO BUONAROT'TI: see MICHEL-ANGELO.

MICHAELIS, *mē-ċhâ-ā'lĭs*, JOHANN DAVID: eminent biblical scholar: 1717, Feb. 27—1791, Aug. 22; b. Halle, where his father, Christian Benedict M., theologian and orientalist, was professor. After completing his studies at his native university, he travelled in England and Holland. In 1745 he became prof. of philosophy at Göttingen, and was active in forming a scientific assoc. there. 1753–70 he was one of the editors of the *Göttinger gelehrten Anzeigen*, and for some years he was librarian to the university. During the Seven Years' War, he made preparations for an expedition of discovery in Arabia, which was afterward made by Niebuhr.

In the latter years of his life, he was almost always in the professorial chair or at his desk. Michaelis was a man of vast attainments in history and archæology, and his labors were of great importance in the departments of Biblical Exegesis and History. He may be regarded as among the earliest of the critical school of German theologians, but he lived at too early a period to acquire anything like a consistent or systematic theory of the genesis of the Hebrew scriptures. He loved to rationalize in details, and was never quite certain what to think about inspiration; at all events, he seeks constantly to prove how thoroughly *human* the Mosaic legislation was, though he does not exactly deny its claims to being considered a divine revelation. Though with a decidedly rationalistic bent in theology, he always claimed to be orthodox; but he confessed that he could not subscribe fully to the Lutheran articles. He was deficient in imagination, and his works, very important in their influence on Hebrew study at the time, are now little read. Many of his pupils became professors, and disseminated his principles through the German universities.

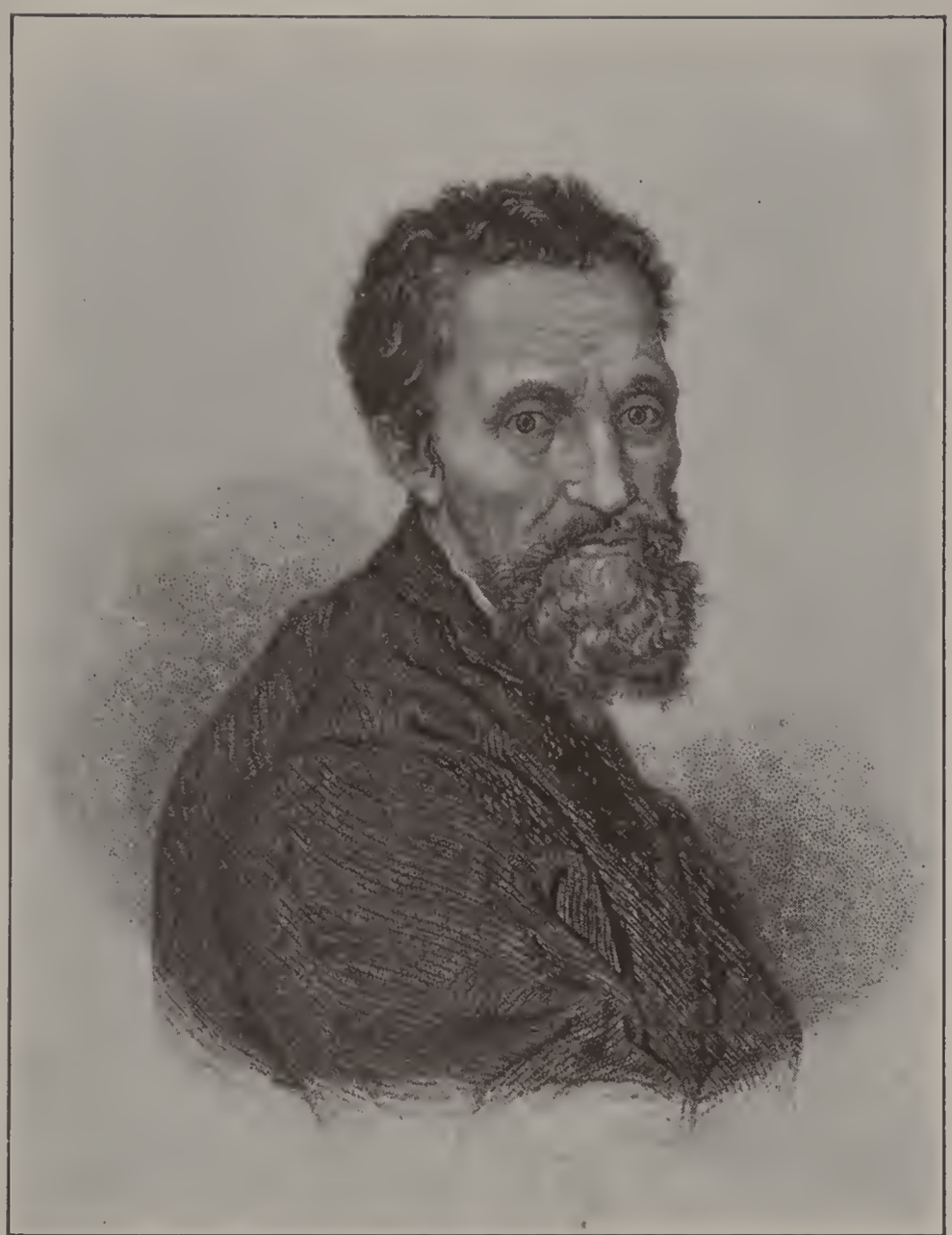
Michaelis' chief works are *Einleitung in die göttlichen Schriften des Neuen Bundes* (2 vols. Gött. 1750; English by Bp. Marsh); *Mosaisches Recht* (6 vols. Frankf. 1770-75; English by Dr. Alexander Smith 1814); and *Moral* (3 vols. Gött. 1792-1823). See his *Lebensbeschreibung von ihm selbst abgefasst* (Rinteln und Leip. 1793).

MICHAELMAS, n. *mĭk'ĕl-măs* [after St. *Michael*, the archangel, and *mass*]: the feast of the archangel Michael, Sep. 29; thence sometimes equivalent to Autumn. This feast of the Rom. Cath. Church is said to have been instituted 487, in honor of all the angels with Michael at their head. The Greek and other Eastern churches observe it; also the Church of England, and the Prot. Episc. Church in the United States. MICHAELMAS-DAY is one of the English quarter-days for payment of rent by tenants—viz., Sep. 29. MICHAELMAS TERM is one of the four legal terms during which the English courts of law and equity sit daily for dispatch of business. It begins Nov. 2, and ends Nov. 25. Michaelmas Head Court was the name given in Scotland for the annual meeting of heritors or freeholders of each county to revise the roll of freeholders.

MICHEL, *me-shĕl'*, LOUISE: French communist, author, editor of *La Révolution Sociale:* b. Vroncourt, Upper Marne, 1830, May 29; d. Paris 1905, Jan. 9. Louise was a favorite at the château where her mother was a servant, and was well educated. When about 18 years of age she went to Paris, and taught in a school at Montmarte until the communal uprising 1871. She embraced the cause of the Commune with fierce enthusiasm, fought in the ranks with the insurgents, was tried by court-martial and sentenced to death. Sentence was commuted to transportation to New Caledonia. She was amnestied

1880 and welcomed in France by 30,000 people. She resided in Paris, caring for her aged mother, writing and lecturing in favor of the Commune. She hated religion and would have destroyed the order of society by fire and sword; but was kind to children and animals, and self-sacrificing in behalf of the poor. Her courage, honesty, and ability were unquestioned. She was shot and seriously wounded while addressing a meeting of anarchists 1888. In 1890, Mar., she completed the libretto of a comic opera entitled *Dans la Lune*.

MICHELANGELO, *me-kĕl-ân'jā-lo* (BUONARROTI, *bô-o-nâr-rŏt'ē*): almost unrivalled as painter, sculptor, architect, in an age when Christian art had reached its zenith: 1475, Mar. 6—1564, Feb. 18; b. Chiusi, in Italy. He was of noble origin, descended on his mother's side from the ancient family of Canossa, in Tuscany, while the Buonarroti had long been associated with places of trust in the Florentine republic. Michelangelo learned the rudiments of painting from Bertoldo, pupil of Domenico Ghirlandaio; and having been admitted as student into the seminary established by Lorenzo the Magnificent for the study of ancient art in connection with the collections of statuary in the Medicean Gardens, he attracted the notice of Lorenzo by the artistic skill with which he had restored the mutilated head of a laughing faun, and was received into the palace of the Medici, where he spent several years. Lorenzo's death 1492, and the temporary reverses which befell the Medici family in consequence of the incapacity of his successor, Piero, led Michelangelo to retire to Bologna, whence he soon removed to Rome, whither his fame had preceded him. His earliest original works were a *Kneeling Angel*, executed for the grave of St. Dominic, at Bologna; the statues of Bacchus and David, at Florence, and a magnificent group representing the *Mater Dolorosa*, which was placed in St. Peter's, at Rome. The *David*, an impressively powerful colossus, the amazement of the youthful artist's contemporaries, was removed 1873 to a hall in the Acad. of Fine Arts. Next in order of time, and, according to some of his contemporaries, first in merit, ranks Michelangelo's great cartoon for the ducal palace at Florence, which, with the pendant executed by Leonardo da Vinci, has long since perished. This work, which represented a scene in the wars with Pisa, when a number of young Florentines, bathing in the Arno, are surprised by an attack of the Pisans, showed so marvellous a knowledge of the anatomical development of the human figure, and such extraordinary facility in execution, that it became a study for artists of every land, and created a new era in art. Pope Julius II. called Michelangelo to Rome, and commissioned him to make his monument, which was to be erected within St. Peter's. Although this work was never completed on the colossal scale on which it had been designed, and was ultimately erected in the Church of St. Pietro ad Vincula,



MICHAEL ANGELO.

it is a magnificent composition, and is memorable for having given occasion to the reconstruction of St. Peter's on its present sublime plan, in order the better to adapt it to the colossal dimensions of the proposed monument. The pope insisted on M. painting with his own hand the ceiling of the Sistine Chapel. M. was unwilling, declaring that painting was not his work; but he began 1508, and completed within less than two years his colossal task, which proved one of the most marvellous of his works. The subjects of these cartoons are from the book of Genesis, while between these and the representations of the persons of the Savior's genealogy are colossal figures of prophets and sibyls. These frescoes on the ceiling of the Sistine Chapel illustrate what is best and grandest in this great painter's art. M.'s genius was too often trammelled by the unworthy tasks in which Leo X. and successive popes engaged him, the pope having employed him for years in planning and superintending the excavation of roads for the transportation of marble from Carrara, and in other ignoble labors. The Florentines and Bolognese vied with the pontiffs in trying to secure his services; and to his skill as an engineer Florence was indebted for the plans of the fortifications by which she was enabled for a prolonged time to resist the attempts of the Medici to recover possession of the city after their expulsion from it. On the surrender of Florence, he returned to Rome, where his great picture of the *Last Judgment* was painted for the altar of the Sistine Chapel. This colossal fresco, nearly 70 ft. in height, completed 1541, was regarded by contemporary critics as having surpassed all his other works for the unparalleled powers of invention and the consummate knowledge of the human figure which it displayed. It is probably the most famous single picture ever painted by human hands. Devoid of beauty and tenderness, it developed to an extreme all that was terrible in the fierce and bitter theology of that age. The Sistine *ceiling* pictures are far more Christian. After its completion, M. applied himself to the perfecting of St. Peter's, which, by the touch of his genius, was converted from a mere Saracenic hall into the most superb model of a Christian church. He refused all remuneration for this labor, which he regarded as a service to the glory of God. M. died at Rome, but his remains were removed to Florence, and laid within the church of Santa Croce. His piety, benevolence, and liberality made him generally beloved; and in the history of art no name shines with a more unsullied lustre.—See Vasari's *Vite de' Pittori* (Eng. trans.), and Lives by Duppa (1806), Harford (1857), Wilson (1876), and H. Grimm (Hanover, 5th ed. 1879).

MICHELET, *mēsh-lā'*, JULES: brilliant French historian: 1798, Aug. 21—1874, Feb. 9; b. Paris; of Huguenot descent. He studied with great success under Villemain and Leclerc, and at the age of 23 became a prof. in the Collége Rollin, where he taught history, philosophy, and the classics. In 1826 he published *Les Tab.*

leaux Synchroniques de l'Histoire Moderne, and was named Master of Conferences (*Maître des Conférences*) at the *Ecole Normale*. After the revolution of 1830, he was chosen head of the historic section, intrusted with the care of the archives of the kingdom; was assistant to Guizot at the Sorbonne; and tutor to the Princess Clémentine, daughter of the French king; and published several valuable books—e.g., *Précis de l'Histoire Moderne* (1833, more than 20 editions), *Précis de l'Histoire de France jusqu'à la Révolution Française* (7th ed. 1842), *Mémoires de Luther* (1835), *Origines du Droit Française cherchées dans les Symboles et Formules du Droit Universel* (1837). In 1838 he succeeded Daunou in the Collége de France, and Comte Reinhard in the professorship of moral philosophy. He then plunged into controversy with all the vivacity and impetuosity of his nature. The Jesuits were the grand objects of his dislike; and eloquence, sarcasm, sentiment, and history all were brought to bear upon them with brilliant effect. Three books were the fruits of his polemic: *Des Jésuits*, in conjunction with Edgar Quinet (1843); *Du Prêtre, de la Femme, et de la Famille* (1844); *Du Peuple* (1846). In 1847 appeared vol. 1 of *Histoire de la Révolution;* and it was finished 1853, in 6 vols. When the affair of 1848 broke out, acting more wisely than most of his learned *confrères*, he declined to take active part in political struggles, and quietly pursued his literary avocations. He, however, lost his situation in the archives office after the *coup d'état*, by refusing to take the oath of allegiance to Louis Napoleon. He died at Hyères. Other works of M. were *L'Oiseau* (1856), *L'Insecte* (1857), *L'Amour* (1858) and *La Femme* (1859)—these two were severely and justly criticised; *La Mer* (1861), *La Sorcière* (1862), *La Bible de l'Humanité* (1864, of little value); and *Nos Fils* (1869), a plea for compulsory education. His masterpiece is his *Histoire de France*, finished 1867, now pub. in 19 vols. Its continuations, somewhat inferior, are *Histoire de la Révolution Française* and *Histoire du XIX^me^ Siècle*. M. was brilliant, original, picturesque; but his work shows the bias of strong prejudices, political and theological; and though he was faithful and laborious in historical research, his prejudices, combined with his vivid imagination, have been thought to detract from trustworthiness while adding to brilliancy.

MICHIGAN.

MICHIGAN, *mĭsh'ĭ-gan:* state: one of the United States, 13th in order of admission into the Union, and thus the 26th of the states, 9th in amount of pop. and wealth, 1st in manufacture of lumber, salt, and production of iron ore and copper, 4th in wheat and sheep, 8th in production of pig iron and steel; by census of 1900, 9th in wool clip, 10th in wheat, 4th buckwheat, 10th in oats, 13th in barley, and 18th in Indian corn: name from Indian words *mitchi* and *sawgyegan*, 'lake country.

Location and Area.—M. has a situation, in its two parts (commonly designated as its southern and northern peninsulas), peculiarly within the waters of the great lakes, lat. 41° 45′—48° 20′ n., long. 82° 25′—90° 34′ w.; bounded in its main part s. by Ind., e. by the w. end of Lake Erie, Detroit river, Lake St. Clair, St. Clair river, and Lake Huron; n. by the upper extremities of lakes Huron and Michigan, and w. by Lake M.; and in its northern part shut in by the waters of Lake Superior on the n., St. Mary's river e., lakes Huron and Michigan s. and s.e., with an extended s.w. boundary on the extreme n.e. part of Wis.: greatest length, n. to s., of main part, 277 m., extreme width 259 m.; length of northern part, e. to w., 318 m., width 30 to 164 m.—this part forming about two-fifths of the state; area of both parts 58,915 sq. m. (37,705,600 acres); elevation of main part 400 to 600 ft. above lake-level; of northern part 400 to 1,100 ft. above Lake Superior; coast-line along navigable lake waters over 1,600 m.; cap. Lansing, since 1847; early cap. Detroit, of terr. from 1805, of state 1835–47. The original terr. of M. organized (1835) as a state was the present s. part only; the n. part was added at admission of state (1837). See *History.*

Topography.—The two parts of the state present a striking contrast in nearly every respect. The s. and main part is generally level, but with a long slope upward from Lake Michigan to a water-shed, the line of which runs n. and s. in the e. part of the state; and with a short slope down to the shores of Lake Huron. The shores of the lakes, on both the e. and the w. sides, are bold, those on the w. especially, often forming bluffs and hills 100 to 300 ft. high; and in the s. occur a considerable number of conical hills, 50 to 200 ft. high. The n. part is in two sections, e. and w. of a line drawn n. and s. through Marquette. The e. section is a plateau which has a long slope upward from its s. border to a water-shed near its n. border, and thence falls rapidly to the shores of Lake Superior. There are many lakes and marshes on this plateau, and a general covering of fine forests, in large part pine and other soft woods, but frequently varied by groves of beech and sugar maple. The w. section of the northern part is rugged, and to a large extent hilly, some of the hills rising 1,000 or 1,200 ft. In the extreme n.w. are the ranges which form the richest copper region known, except Chili. The central range reaches from Keweenaw Point entirely across into Wis., and on either side it is flanked by the Porcupine

mt. range and the s. copper range. These ranges are well clothed with timber, mostly sugar maple, with very little pine or other soft wood. By the side of the s. copper range lies the iron range of Marquette co. The soil of the northern part of M. is generally sterile; but in the southern and main part, the depth of loam, often mixed with gravel or clay, secures lands of remarkable fertility. The number of lakes and lakelets scattered through all parts of M. is over 5,000, covering 712,864 acres. The rivers are mostly small, but their number is so great as to abundantly water all parts of the state. The Saginaw, Grand, St. Joseph, and some others are to a small extent navigable. The rivers which flow into Lake M. are the St. Joseph, Kalamazoo, Grand, Muskegon, Manistee, Grand Traverse, Manistique, and Escanaba; into Lake Erie, the Huron and Raisin; into Lake Huron, the Saginaw, Au Sable, Thunder Bay, Cheboygan; into Lake Superior, the Ontonagon and Tequamenon. There are groups of islands in the various lake waters—e.g., the Manitou, Fox, and Beaver, in Lake M.; the Bois Blanc, Mackinaw, and Marquette, in the n. part of Lake Huron; Sugar and Nebish islands, in St. Mary's river, and Drummond's Island at its mouth; Grand Island and Isle Royale, in Lake Superior. Isle Royale, with a large number of rocky islets clustered about it, forms an important part of Keweenaw co., 55 m. n.w. from Keweenaw Point, and within 15 m. of the Canada shore: length n.e. to s.w. 45 m.; greatest width 9 m.; area 225 sq. m. It is well clothed with timber, and rises, at points of a central ridge, to 700 ft. The rich copper range of the mainland occurs in it, and there are many relics of ancient mining, such as stone hammers weighing 10 to 30 lbs.; copper knives and other tools which have been hardened by fire; excavations extending continuously more than two m.; underground drains, one of which was cut 60 ft. through rock and covered with large timbers; and many other evidences of skill in mining, following the deposits of sheet-like copper, and making no account of nuggets. On the s. side, where a stream 40 ft. wide has cut a passage through the shore rocks, there are indications of an ancient town, on an elevated slope overlooking the lake, but no human remains. Copper arrowheads have been found on this island, and a rude wooden bowl 3 ft. in diameter. Since the ancient mines were abandoned, at least one generation of the immense trees of the natural forest has grown over them. In all parts of M. lakes are numerous, varying in area from a few acres to several sq. m. The marginal waters of the great lakes contiguous to M. afford navigation for the largest ships and steamers. Navigation around the falls of the St. Mary's, giving passage from Lake Superior to Lake Huron, is effected by means of the St. Mary's ship-canal, at Sault Ste. Marie, originally opened 1855, with two locks, each 70 ft. wide and 350 ft. long between gates, and canal one m. long, giving passage to vessels drawing not over 11½ ft.; the whole improvement

Area in Square Miles, 58,915	Population, 2,420 982
Number of Counties, 83	Capital of State, Lansing

A B C D E F

costing $999,802. The St. Mary's river, connecting lakes Superior and Huron by a water-way 75 m. long, is properly a series of lakes linked together by narrow and crooked channels. The fall, through the first 50 m. from Lake Superior, is 20.5 ft., and practically it begins 15 m. from Lake Superior, at the falls of St. Mary, where 18 ft. of descent occur in about one m., while for the 35 m. beyond 2.3 ft. of fall occur. The earliest improvement by canal and locks, 1852–55, was provided for by a congressional grant of 750,000 acres of land, and the tonnage through the canal which followed was 100,000 tons the first year, 400,000 five years later, 700,000 ten years later, 1,260,000 in 1875, and 1,750,000 in 1880, at which time the pig-iron production of the United States was drawing one-third of its total supply of ore through this channel, from the Lake Superior mines. Before 1880 the pressure of shipping showed the necessity of a further construction, and the second canal was executed, one of the most important and remarkable engineering works of the time, having a length of 515 ft., width 80 ft., and depth of water over the mitre sill 17 ft. This was opened for business 1881, Sep. 1; and meanwhile extensive improvements were made in the canal above the new lock, and at points in the channel below, and a depth of water obtained nearly equal to that of the lock. The cost of the second work was $2,000,000, and its value in saving cost of iron-ore transportation was $800,000 the first year. To complete needed communication, congress 1881, Dec. 29, called on the war dept. for a report as to additional works, and 1882, Jan. 14, Gen. Godfrey Weizel made this, recommending the immediate construction of another lock, the improvement of Hay Lake channel, and the making of a dry-dock on the canal, at an estimated cost of $4,738,865 for the lock and canal, and $2,659,115 for Hay Lake channel. The new lock was constructed on the site of that of 1855, 800 ft. long, 100 ft. wide, with 21 ft. of water over the mitre sill. Hydraulic machinery operates the gates and valves of the locks, and a movable dam has been constructed for stopping the flow of water through the canal or locks whenever required by any accident to the locks or the banks below.

Climate.—In a state covering so wide a range of latitude, climatic conditions necessarily show large variations. The mean annual temperature varies from 40.4° in the Upper Peninsula to 46.9° in the southern part of the Lower Peninsula. The mean average temperature in July and August is 64.2° in the first named region, and 71.6° in the latter. In January and February, the mean average varies from 14.3° to 23.5°. The annual rainfall averages 28 inches. Owing to the proximity of the lakes, the climate of the southern peninsula is milder in winter and cooler in summer than in other parts of the country in the same latitude.

In the northern part of the Lower Peninsula many attractive summer resorts have developed along the lake coast. At other places popular resorts have built up on account of the medicinal value of mineral springs, chief among these being Mount Clemens; while the waters of four mineral springs find a market.

Rivers and Lakes.—Along the lake coasts are numerous bays and inlets. Keweenaw, White Fish and the Big and Little Noquette bays are the principal indentations on the north; while the Grand and Little Traverse, Thunder and Saginaw bays indent the southern peninsula. The rivers are small, short and shallow. The most important are the Grand, flowing into Lake Michigan; and the Saginaw, flowing into Lake Huron; each of which is navigable for about forty miles. Among the other rivers may be mentioned the Au Sable, Thunder Bay, and Cheboygan, flowing into Lake Huron; Ontonagon and Tequamenon into Lake Superior; and the St. Joseph, Kalamazoo, and Escanaba into Lake Michigan. Lakes abound throughout the state, over 5,000 in all, and no less than 175 are in the basin of the Kalamazoo river. These lakes are valuable sources of water supply, which is abundant throughout the state. The largest lakes are Houghton, Mullets, and Burts, in the northern part of the Lower Peninsula; and Manistique in the Upper Peninsula.

Geology.—The geology of the state represents every series known from the oldest strata to the carboniferous. Primary boulders are found over the entire surface, the northern part being principally of primitive origin, while Secondary deposits cover the entire southern peninsula. The Upper Peninsula exhibits Lower Silurian sandstones, limestones, copper and iron bearing rocks, corresponding to the Huronian system of Canada. The Mineral Range of Mountains is of eruptive or volcanic rock, with older strata tilted upon its side. Farther eastward are the long belts of the Lower Silurian, curving from Green Bay through the St. Mary's Peninsula. The central portion of the southern peninsula contains coal measures and rocks of the permo-Carboniferous period. The coal-bearing area of about 5,000 square miles is in the neighborhood of Saginaw; but the coal is for the most part of inferior quality. The surface of the state is largely determined by glacial action, being covered with a sheet of till, in some places some hundreds of feet in thickness. The rivers are upon the drift surface.

Minerals.—Michigan possesses vast mineral wealth, especially in the copper and iron mines of the upper Peninsula. The Calumet and Hecla and other famous copper mines are on Keweenaw peninsula, and furnish a quality of copper nowhere surpassed and, for many purposes, unequaled. Up to about 1900 Michigan had the largest copper output in the United States, and it still ranks among the first group in the copper-produc-

ing States, having a yearly output of almost 70,000 tons. In iron ore M. also led the country for many years. It still occupies a high place, having an annual production worth more than $20,000,000. Some gold is found in the Upper Peninsula, and silver and lead in small amounts. Salt, found in large quantities in the Saginaw Valley, forms the chief mineral product of the Lower Peninsula, being worth more than $2,500,000 a year. In the same region coal mining has been developed, chiefly since 1898, and at present the annual output of coal can be depended upon to average $2,000,000. Brick, tile, and other clay products are cheaply and easily made in many parts of the State, while the manufacture of Portland cement has greatly increased of recent years. Building stone, including marble and other ornamental stone, is found in many sections in the Upper Peninsula. Large deposits of gypsum are found in the Lower Peninsula, near Grand Rapids; glass stone is to be found in the s.e. portion of the State, and grindstones are quarried on the shores of Lake Huron.

Forests.—Its abundant forests have been one of the most important sources of wealth and material prosperity to M. Originally the Upper Peninsula and the n. section of the Lower Peninsula were covered with dense forests of conifers, consisting mainly of white pine. Farther s. hard woods were intermingled in greater proportion, although the most southern part was chiefly prairie land. Besides white pine, the principal trees include basswood, maple, sassafras, butternut, walnut, poplar, hickory, oak, willow, birch, beech, hemlock, witch-hazel, tamarack, cedar, locust, dogwood and ash. Including stump land, the total forest area of the State is estimated at almost two-thirds of its total area. Until after 1860 the production of lumber was relatively small, but by 1870 M. had gained first place as a lumber State, and this position it continued to hold until 1900, when the partial exhaustion of her resources caused her to fall slightly behind Wisconsin. M. is still one of the most important lumber States in the Union.

Agriculture.—This is undoubtedly the chief industry in M., as well as the most lucrative, about one-third of the industrial population being engaged in agricultural pursuits, while farm lands, approximately seven-tenths of which are improved, cover about one-half the entire area of the State. Most of the farming is in the Lower Peninsula. Cereals constitute the most important farm crops, corn being the leading crop, followed by wheat and oats, while hay and forage yield nearly one-fourth of the total value of farm crops. Vegetables are raised in large quantities, the State's production of beans, peas, celery, chicory, peppermint, potatoes, and sugar beets being particularly notable. Fruit culture is yearly assuming added importance, apples and peaches being the principal orchard products, although pears, plums, and grapes are produced in great profusion. M. is

particularly noted for its output of small fruits. The live stock interests are extensive and constantly increasing. Horses and dairy cows are the most important animals, although there are very large numbers of other neat cattle, sheep, and swine. In its production of milk, butter and eggs, and wool M. ranks among the foremost of the States.

Manufactures.—There are nearly 5,000 manufacturing establishments in the State, producing finished products to the value of approximately $500,000,000 a year. The industrial development of M. has been marked by a steady diversification of its manufactures. For some time the only industry of importance was the manufacture of lumber and timber products, and this still retains its high stand, although, with the decline in lumbering, there has been some falling off in the value of crude lumber products. However, the more intricate and specialized industries continue to develop. At present the most important industries are lumber and timber products, foundry and machine-shop products, flour and grist-mill products, smelting and refining copper, carriages and wagons, furniture, lumber, planing-mill products, including sash, doors, and blinds, and steam railroad cars. Iron and steel and other metals, chemicals, and leather products are also notable. There has been a tendency to localize the manufactures in the s. half of the Lower Peninsula, Detroit being the largest manufacturing centre, and leading conspicuously in its output of stoves, pharmaceutical chemicals, and tobacco. Grand Rapids is notable as one of the great furniture centres of the world; Battle Creek is celebrated for its breakfast foods; ship-building is carried on at Port Huron, Detroit, and Wyandotte; and there are important silk interests at Belding.

Commerce and Transportation.—M. has four ports of entry, Detroit, Port Huron, Grand Haven, and Marquette. Its proximity to Canada would make these important centres of foreign trade under favorable conditions, but the present tariff keeps the volume of trade down, the annual imports amounting to much less than $10,000,000, while the exports are scarcely $30,000,000. However, internal and interstate commerce is of vast and growing importance, especially traffic on the Great Lakes, which has been greatly promoted by improvements to navigation within the last decade, especially by the construction of ship canals at the falls of the St. Mary's river, across the shallows at the head of Lake St. Clair, and across the Keweenaw peninsula. The most important items in the lake traffic are iron ore, grain, flour, and coal. The annual arrivals and clearings of vessels at Detroit aggregate 5,000,000 tons.

There are about 9,000 miles of track in M., besides a rapidly extending electric street railway system, including both local and interurban lines, which includes altogether about 1,500 miles of track.

Finance and Banking.—The total assessed valuation of property, both realty and personal, amounts to $1,687,155,697, the tax rate being $2.72 per $1,000. There is no bonded debt. There are about 300 State banks, almost 100 national banks, and a very few savings societies and loan and trust companies. Ann Arbor, Grand Rapids, Detroit, and Kalamazoo all conduct clearing-house businesses.

Education.—M. spends nearly $13,000,000 a year in the maintenance of its public schools, there being about 525,000 pupils enrolled with about 17,500 teachers. Besides its normal schools, the State maintains the University of M. at Ann Arbor, the Agricultural College at Lansing, and College of Mines at Houghton. There are also about 450 private schools and about 10 private colleges in the State. Aside from the State library at Lansing and the University library at Ann Arbor, there are large public libraries at Detroit, Grand Rapids, and many other cities. The press is well developed, there being well over 800 newspapers and periodicals issued.

Religion.—The Roman Catholic is the strongest denomination in M., being followed by the Methodist Episcopal, Lutheran, Baptist, Presbyterian, Congregationalist, and Protestant Episcopal. The German Reformed, United Brethren, and Disciples of Christ, and Adventists also have considerable representations.

Charities and Corrections.—The most important charitable institutions maintained by the State include insane hospitals at Kalamazoo, Pontiac, Traverse City, Newberry, and Ionia, the last named being for the criminal insane; a home for feeble-minded and epileptic at Lapeer; a soldiers' home at Grand Rapids; a school for the deaf and dumb at Flint; a school for the blind and an industrial school for boys at Lansing, an industrial home for girls at Adrian; and a school for neglected and dependent children at Coldwater, the last named being the first institution of its kind in the country. The State corrective institutions include State prisons at Jackson and Marquette and a reformatory at Ionia.

History.—French explorers first visited the site of Detroit 1610, and the falls of St. Mary 1641. Marquette made the first settlement at Sault Ste. Marie 1668; Fort Mackinac was settled 1671; and 1701 Detroit was founded, and, in presence of Indian chiefs of the northwest, formal possession was taken for Louis XIV. of all territory from the lakes to the South Sea, and a cedar post erected to mark the event. Wolfe's victory at Quebec 1759, Sept. 13-18, led to surrender of Detroit and other n.w. posts 1760. French rule finally yielded to British 1763, and Pontiac's conspiracy and exterminating war followed this change. Nominal American possession began 1783, at the close of the Revolution, but was not actual until 1796, when Detroit was first occupied by an American force, M. having been from 1787 part of the n.w. terr., of which Gen. St. Clair was the first gov. From 1802 it was a part of Indiana

terr. (cap. at Vincennes); 1805 the terr. of M. was created, with Hull as gov., who, as American commander in the war of 1812, surrendered it to British control 1812, Aug. 16. Col. McArthur recovered possession 1813, Sept. 29, and Col. Lewis Cass was made gov. for a period of extraordinary service, 1813-31, in dealing with Indians, securing surveys, opening roads, and preparing the foundations of a state. Govt. surveyors to locate bounty lands for soldiers in the war of 1812 reported against M. lands as swampy and sterile, and turned immigration away. In 1817 Chippewas and Wyandottes ceded 4,000,000 acres of what is now in n. O. and Ind. and s. M., giving M. settlements their first connection with those of O. and Ind. On the admission of Ill. into the Union, 1818, all the terr. lying n. of that state and Ind. was annexed to the terr. of M., and 1819 congress authorized this enlarged terr. to elect one delegate to Washington, with the right to speak, but not to vote. The Chippewas, 1819, ceded by treaty of Saginaw 6,000 acres of land; 1821, by treaty of Chicago, Chippewa, Ottawa, and Pottawattamie tribes ceded the land next w. of the Saginaw cession and s. of Grand river, and 1823 the Delawares gave up all that in the valley of the Muskingum. 1820, May 6, Cass and Schooleraft set off at head of an exploring party, which made a journey of 5,000 m. in the n. w., as far as upper Red Cedar Lake. In 1823 Congress gave M. terr. the privilege of a legislative council of 9 appointed by the pres. out of 18 elected by the people; 1834 a census showed a pop. (87,278) entitled to form a state; 1835, Jan., legislative council authorized a convention to form a constitution; this body was elected Apr., and met at Detroit May; and Oct. the constitution was adopted, and state officers and legislature elected. Congress refused application for admission into the Union, except on conditions which a convention in M., 1836, Sept. 2, refused to submit to, a dispute existing as to the right of M. to extend to a line drawn due e. from the s. point of Lake M., and congress asking M. to yield the Toledo strip n. of this line, and take instead of it the present Upper Peninsula. A self-originated Jackson party convention assumed to accept this 1836, Dec. 6, and congress recognized this action and admitted the state 1837, Jan. 26, on the same day as Arkansas. A new constitution in 1850 was the final basis on which has been erected during 40 years one of the most remarkable of the great examples of state growth ever known. In the war of 1860–64, with a pop., 1864, of 805,379, M. had sent 90,747 men to the field, and the state, counties, cities, and towns had paid for war purposes $16,548,993, besides both state and private benefactions to disabled soldiers.

The state had prohibited the sale of liquor in 1855; but in 1876 the prohibition law was repealed, and a license tax substituted, which has since been raised to a high figure. In 1881 the United States ship canal

around St. Mary's Falls was completed, paving the way for the rapid development of the mining resources of the Upper Peninsula. In 1889 the Australian ballot was adopted. The question of a general revision of the State constitution was voted on in 1892, and again in 1898; but on both occasions failed to secure the required vote. Many amendments to the constitution have, however, been adopted from time to time. In recent years the most important legislation has been that dealing with taxation, especially of corporations. In politics Michigan was Democratic with the exception of two elections until 1854; and it has been Republican since, with but three exceptions—in 1882 and 1883 fusion Democratic-Greenback tickets, and in 1890 the Democratic party was successful. Among the leading Michigan men in public life may be noted:—Lewis Cass, who after his long service as governor of the territory, filled positions in the cabinets of two Presidents, was senator for two terms (1845–57) and a candidate for President of the United States; Zachariah Chandler, senator for three terms (1857–75), and secretary of the interior; James V. Campbell, justice of the Supreme Court from 1858 until his death in 1890; and Thomas M. Cooley, justice of the Supreme Court from 1864 to 1885, and chairman of the Interstate Commerce Commission. The state has voted for pres. and vice-pres.: 1837, Martin Van Buren and Richard M. Johnson, 3; 1840, William Henry Harrison and John Tyler; 1844, James K. Polk and George M. Dallas, 5; 1848, Lewis Cass and William O. Butler; 1852, Franklin Pierce and William R. King, 6; 1856, James Buchanan and John C. Breckinridge; 1860, Abraham Lincoln and Hannibal Hamlin; 1864, Abraham Lincoln and Andrew Johnson, 8; 1868, Ulysses S. Grant and Schuyler Colfax; 1872, Ulysses S. Grant and Henry Wilson, 11; 1876, Rutherford B. Hayes and William A. Wheeler; 1880, James A. Garfield and Chester A. Arthur; 1884, James G. Blaine and John A. Logan, 13; 1888, Benjamin Harrison and Levi P. Morton, 13; 1892, Grover Cleveland, 5, and Benjamin Harrison, 9, total 14; 1896, William McKinley and Garret A. Hobart, 14; 1900, William McKinley and Theodore Roosevelt; 1904 Theodore Roosevelt and C. W. Fairbanks; 1908, W. H. Taft and J. S. Sherman.

Population.—In 1810 the population of Michigan was 4,762; (1830) 31,639; (1840) 212,267; (1850) 397,654; (1890) 2,093,890; (1900) 2,420,982; (1910) 2,810,173. The principal cities are Detroit, 465,766; Grand Rapids, 112,571; Saginaw, 50,510; Bay City, 45,166; Jackson, 31,433; Kalamazoo, 39,437; Muskegon, 24,062; Port Huron, 18,863; Battle Creek, 25,267; Lansing, 31,229; and Ann Arbor, 14,817. Other cities of importance are Manistee, Ishpeming, Flint, Menomonee, West Bay City, Sault Ste. Marie, and Marquette.

Bibliography.—Cooley, 'Michigan: A History of Governments' (1885); Farmer, 'The History of Detroit and Michigan' (1889); Lamman, 'History of Michi-

gan, Civil and Topographical' (1839); McLaughlin, 'History of Higher Education in Michigan' (1891); Sheldon, 'The Early History of Michigan' (1856).

MICH'IGAN, LAKE: one of the five great fresh-water lakes, the only one wholly in the United States: having Mich. on the n. and e., Wis. and Ill. on the w., and Ind. on the s.; 345 m. extreme length, 84 m. extreme breadth; average breadth 70 m.; 22,400 sq. m.; mean depth, 1,000 ft. It is of about the same area as Lake Huron, and surpassed only by Lake Superior. It is 578 ft. above sea-level, and has been found by accurate observations to have a lunar tidal wave of three inches. It is the outlet of numerous rivers, and is connected, near its s. extremity, by a canal, and sometimes by flooded rivers, with the Mississippi, which is believed to have been its ancient outlet. At its n.e. extremity it communicates with Lake Huron through the Straits of Mackinaw, 4 m. wide at the narrowest part. It has two large bays, Green Bay (100 m. long), and Grand Traverse Bay (30 m. long); the largest islands are Beaver Island, in the n. part (50 m. long) and Fox Islands, in the n.e. Its principal harbors are those of Chicago, Milwaukee, and Grand Haven. It forms, with the lower lakes and the St. Lawrence, a natural outlet for one of the richest grain-growing regions in the world.

MICHIGAN, UNIVERSITY OF: founded 1837, Mar. 18, at Ann Arbor, Washtenaw co., Mich., on land granted by congress, 1826, to the territory of Mich. It was opened for students 1842, Sep. 20. It is part of the state system of public instruction; its purpose being to complete the course of instruction begun in the public schools, by giving a liberal education in the sciences, arts, and literature. It is supported by the state, and open to students of both sexes free of charge, except a small matriculation fee, and $15 annually. While primarily intended for students from Mich., admission is granted to others, at a slight advance in the matriculation fee. The university has seven departments: literature, science, and the arts; engineering; medicine and surgery, organized 1850; law, organized 1859; school of pharmacy; the homeopathic medical college; and the college of dental surgery. Selected studies also may be pursued for any period not less than one term; while any graduate of the university, or of any other collegiate institution, may pursue a post-graduate course for advanced study in any department, whether for a second degree or not. The degrees conferred are, on the completion of the classical course, B.A.; of the scientific, B.S.; Latin and scientific, PH.B.; Greek and scientific, PH.B.; civil engineering, C.E.; mining engineering, M.E. Degrees are conferred also on the completion of the regular 2-years' course in law, in medicine, in analytical chemistry, and in pharmacy. The management of each department and school is vested in its own faculty; while all the faculties together, numbering about 50 pro-

fessors and assistants, exclusive of a considerable number of lecturers and assistants, constitute the university senate, which considers question of common interest to them all. The libraries of the university, accessible to the students, aggregate about 67,000 vols., divided among the university library, the medical, the law, the libraries of two literary societies, and that of the Y. M. C. A. connected with the institution. The astronomical observatory contains one of the largest and best meridian circles of its kind in the country; the collimators for the same; a sidereal clock, made by Tiede, of Berlin; the library of the observatory, and the smaller instruments, among which is a chronograph with Bond's isodynamic escapement, for recording observations by the electro-magnetic method. The building consists of a main part, with 2 wings, and a movable dome; in the dome is mounted a large refracting telescope, with object-glass 13 in. in diameter, by Henry Fitz, of New York. The observatory was the gift of the people of Detroit, and was opened 1854. The university museum is in a recently erected fire-proof building 127 ft. long by 47 ft. wide. The collections in the various cabinets are full and valuable, and are constantly increasing. The geological cabinet contains about 45,000 specimens, including a very valuable and complete series of lithological and paleontological specimens; the zoölogical has about 120,000 specimens, including a complete series of the birds that visit Mich., and nearly complete series of the mammals of the state, and of the reptiles found e. of the Rocky mts., besides full collections of mollusca, fishes, and radiata; the botanical has about 75,000 specimens, of which about 10,000 are specimens of the plants of the state, besides a rare collection of Alaskan flora. In the mineralogical cabinet, besides an excellent collection of the minerals of the state, there is also one of about 6,000 European specimens purchased from the late Baron Lederer. In the department of history and fine arts there are collections of casts of the most important ancient busts and statues; of foreign engravings and photographic views; historical medallions, and copies of modern statues, busts, and reliefs by the great masters. The archeological cabinet has an interesting collection of relics of Indian and South Pacific islanders' instruments and utensils of domestic use. The anatomical museum is well furnished, and together with the clinical lectures enjoyed by the students makes the medical department one of the most thoroughly equipped in the country. Besides the observatory and museum, there are on the university grounds, embracing 44½ acres, a central building called University Hall, for the department of literature, science, and art; several buildings for those of law and medicine; a chemical laboratory; and the residences of the president and professors. University Hall is 347 ft. front, 140 ft. deep in the centre, and 40 ft. on the wings. It is surmounted by a dome 140 ft. high from the ground. In the front

of the second story it has a handsome and well-arranged audience-room with seating capacity of 3,000. The proceeds from the sale of the original university lands constitute a fund of about $543,000, held in trust by the state, and drawing interest at the rate of 7 per cent. A board of regents has the control of the university. These are elected by the qualified voters of the state, and serve for a term of 8 years. Elections are held biennially for 2 regents, 2 retiring every 2 years. The president of the university is *ex officio* a member and president of the board of regents, by whom he is chosen for his office. Previous to 1852 the university had no president. Since then it has had four, including the present incumbent, James B. Angell, LL.D., who has held the office since 1871, though absent 1880–1, when he was U. S. minister to China and chairman of a special committee to negotiate a treaty with that country. In 1905–6 the univ. had 300 professors and instructors, 194,672 vols. in the libraries; scientific apparatus and library valued at $1,000,000; grounds and buildings val. at $1,500,000; total income about $800,000; students in all depts., 4,571, of whom 1,566 were in the collegiate department and 813 in the summer session.

MICHIGAN CITY: city in Laporte county, Ind., on Lake Michigan, and on the Chicago, I. & L., the Michigan C., and the Lake E. & W. railroads; about 40 miles east of Chicago. The place was visited frequently in the 18th century by missionaries, explorers, and traders, but the first permanent settlement was made in 1833. The incorporation was made in 1837. It has excellent transportation facilities which contribute to its commercial and industrial growth. Its chief manufactures are hosiery, knit underwear, chairs, lumber, railroad cars, and furniture. It has a large trade in iron ore, salt, lumber, and farm products. It has the Northern Indiana State Prison, a United States life-saving station, and on the lake front a park. Its educational institutions are a high school, public and parish schools, and a public library. The city is governed under a charter of 1867, since amended, which provides for a mayor, elected biennially, and a common council. The administrative officials are elected by the council or appointed by the mayor subject to the approval of the council. The waterworks are owned and operated by the city. Pop. 14,850; (1910) 19,027.

MICHIGAN COLLEGE OF MINES, at Houghton, in the State of Michigan, was founded in 1885 and opened in 1886. The school is located in the midst of the mining region of the state, thus giving the students exceptional opportunities for observation and study. Practical work in mine surveying and mining is carried on for five weeks, 45 hours each week. The first two weeks are devoted to surveying and mapping a mine in the 'copper country' or in the iron mining district; the last three weeks are given to the examination of mining

methods, and to making sketches of mines in the vicinity. The courses of study lead to the degrees of bachelor of science and engineer of mines. The school is well equipped with all necessary apparatus. The metallurgical and assay laboratory is a brick building; and the ore-dressing building, or stamp mill, is a wooden building.

MICHIGAN STATE AGRICULTURAL COLLEGE, chartered in 1855, and opened in 1857, situated at Lansing. It was the first institution for agricultural education established in the United States. The Michigan State constitution provided that 'The legislature shall as soon as practicable provide for the establishment of an agricultural school.' In 1850 the legislature petitioned congress for a grant of land for an agricultural college within the state, but no attention was paid to this petition. In 1855, however, the legislature appropriated land and money for such a college, and located it on a farm of 684 acres. From that time until 1862 the college was supported by state appropriations; and in that year received control of the Federal land grant. The courses offered in the college include the full four years' courses in agriculture, mechanical engineering, and domestic science, and short courses (varying from four to twelve weeks) in chemistry, beet sugar production, cheese making, dairy husbandry, creamery management, live-stock husbandry, and fruit culture; graduate work is also provided for. The college organizes Farmers' Institutes throughout the state, which are under the supervision of members of the faculty. The experiment station is also connected with the college, and receives a separate Federal appropriation of $15,000 annually. Women are admitted to all courses, but form a small proportion of the graduates. The farm consists of 684 acres, and the buildings are valued at over $440,000. The library contains 25,000 volumes. Students number over 800 and the faculty 60.

MICHILIMACK'INAC: see MACKINAW.

MICHIPICOTEN, *mĭsh-ĕ-pĕ-kŏ'tĕn:* a bay in the western part of the province of Ontario, in Canada. It is an arm of Lake Superior, on the northeast shore; about 100 miles north of Sault Ste. Marie. At the entrance to the bay is Michipicoten Island.

MICHOACAN, *mē-chō-â-kân'*, or MECHOACAN, *mā-chō-â-kân':* one of the states of Mexico, extending from 18° to 21° n. lat. on the Pacific; 22,874 sq. m. It is bounded on the north by the states of Guanajuato and Jalisco, on the east by Mexico, on the south by Guerro and the Pacific, on the west by the Pacific, Colima and Jalisco. Area, 22,874 sq. m. (Two railroad lines cover the state.) The soil is fertile; the principal crops are sugar, tobacco, vanilla, wheat, rice and tropical fruits. A large portion of the territory is mountainous, and there are several volcanoes, of which Jorullo is most noted. The highest altitude in the state is about 17,000 feet. There are 11 lakes, the largest of which, Chapala, is about 60 miles long by 20 miles wide.

The principal rivers are the Lerma and the Mescala, but there are many mountain streams by which the valleys are abundantly watered. Buceria and Maratua are the sea-ports. The climate ranges from the extremes of heat on the coast to cold on the mountains, and except in parts of the low land is quite healthful. The products of the various mines of gold, silver, copper, lead, iron, etc., amount to over $1,000,000 per year, and lithographic stone and marble are quarried in considerable quantities. Domestic animals are reared in large numbers, and fish abound in the lakes and rivers. Among the manufactures are shawls, blankets, and silver-ware. Coffee, indigo, silk, and various dye-woods are exported. The cap. is Morelia. There are a large number of schools and a state college. Pop. (1900) 935,849.

MICIP'SA: see JUGURTHA.

MICKLE, a. *mĭk'l* [AS. *micel;* Icel. *mikill;* Goth. *mikils;* Scot. *meikle* or *muckle*, much, great]: in *OE.*, much; great.

MICO, n. *mī'kō* [Sp. *mico*]: a small S. Amer. monkey.

MICRASTER, n. *mĭ-krăs'tẽr* [Gr. *mikros*, small; *astron*, a star]: in *geol.*, a genus of sea-urchins abounding in the Chalk, and so termed from the star-like arrangement of its small or incomplete ambulacral furrows.

MICRO, *mī'kro* [Gr. *mikros*, small]: a prefix in scientific words signifying 'smallness': among electricians, and on the C. G. S. system, division by a million.

MICROBES, n. plu. *mī'krōbz* [Gr. *mikros*, small; *bios*, life]: minute organisms found in the blood of animals suffering from splenic fever, as its producing cause; a general term for any very minute organisms of the nature of Bacteria, comprising micrococcus, etc.: see BACTERIUM: GERM THEORY: KOCH, ROBERT: PASTEUR, LOUIS.

MICROCEPHALOUS, a. *mī'krō-sĕf'ă-lŭs* [Gr. *mikros*, small; *kephălē*, head]: having a small or imperfectly developed head or cranium. MICROCEPHAL'IC, a. *-sē-făl'ĭk*, term applied to skulls having a capacity below 1,350 cubic centimetres.

MICROCHRONOM'ETER: see MICRONOMETER.

MICROCOCCUS, n. *mī'krō-kŏk'ŭs* [Gr. *mikros*, small; *kokkos*, a kernel]: any minute form or organism supposed to have life; a genus of the Bacteria, the basis of all yeast formations, and a source of fermentation.

MICROCOSM, n. *mī'krō-kŏzm* [Gr. *mikros*, small; *kosmos*, the world]: the little world, applied to man as the cosmos in miniature, or as supposed to be an epitome of the universe or great world, which was called the *macrocosm* (great world). MI'CROCOS'MIC, a. *-kŏz'mĭk*, or MI'CROCOS'MICAL, a. *-kŏz'mĭ-kăl*, pertaining to the microcosm.—The belief, current in ancient times, that the world or cosmos was animated, or had a soul (see ANIMA MUNDI), led to the notion that the parts and mem-

bers of organic beings must have their counterparts in the members of the cosmos. Thus, in a hymn ascribed to Orpheus, the sun and moon are as the eyes of the animating godhead, the earth and its mountains as his body, the ether is as his intellect, the sky as his wings. The natural philosophers of the 16th c.—Paracelsus at their head—took up this notion anew, modified it, and considered the world as a human organism on the large scale, and man as a world, or cosmos, in miniature. With this was associated the belief that the vital movements of the microcosm exactly correspond to those of the macrocosm, and represented them, as it were, in copy; and this led naturally to the further assumption that the movements of the stars must exercise an influence on the temperament and fortunes of men: see ASTROLOGY.

MICROCOS'MIC SALT: sodium ammonium hydrogen phosphate, which crystallizes with 4 equivalents of water, its formula being $Na.NH_4.H.PO_4+4Aq$. It is prepared by mixing a hot solution of 6 parts of phosphate of soda with a concentrated solution of 1 part of muriate of ammonia, when the M. S. crystallizes in large transparent prisms, while common salt remains in solution. On the application of heat, it first loses its water of crystallization, and then its oxide of ammonium and basic water, so that only metaphosphate of soda remains, which, from its ready fusibility into a colorless glass, is valuable as a flux in blow-pipe experiments: see BLOW-PIPE. This salt was obtained originally from decomposed urine, whence its name, alluding to man, the 'microcosmos.'

MICROCOUSTIC, a. *mī-krō-kow'stĭk* [prefix *micro-*; Eng. *acoustic*]: serving to increase small or indistinct sounds; of or pertaining to a microcoustic: N. an aural instrument for collecting sounds for the partially deaf; an auricle or speaking-trumpet.

MICROCRITH, n. *mī krō-krĭth* [prefix *micro-*; Eng. *crith*]: in *chem.*, the weight of an atom of hydrogen.

MICROFARAD, n. *mī-krō-făr'ăd* [prefix *micro-*; Eng. *farad*]: in *electro-magnetics*, the millionth part of a farad. The farad being too large for practical purposes, the M. is often used in its pdace.

MICROGEOLOGY, n. *mī-krō-jē-ŏl'ō-jĭ* [prefix *micro-*; Eng. *geology*]: department of the science of geology whose facts are ascertained by the use of the microscope.

MICROGONIDIUM, n. *mī-krō-gō-nĭd'ĭ-ŭm* [Gr. *mikros*, small; *gonos*, offspring, seed; *cidos*, resemblance]: in *Algœ*, a single small zoöspore found in a germinating cell, formed at the expense of the contained plastic materials.

MICROGRAPH, n. *mī′krō-grăf* [Gr. *mikros*, small; *graphō*, I write, I draw]: instrument for executing extremely minute writing and engraving; its general principle is that of the pantograph.

MICROGRAPHY, n. *mī-krŏg′ră-fĭ* [Gr. *mikros*, small; *graphō*, I describe]: a description of microscopical objects. MICROGRAPHIC, a. *mī′krō-grăf′ĭk*, relating to micrography.

MICROLESTES, n. *mī′krō-lĕs′tēz* [Gr. *mikros*, small; *lēstēs*, a robber]: in *geol.*, a small fossil insectivorous quadruped.

MICROLITE, n. *mī′krō-līt* [Gr. *mikros*, small; *lithos*, a stone]: mineral occurring in exceedingly small octahedral crystals, hence the name. It has lately been found in well-defined crystals up to an inch and a half in diameter, and larger imperfect ones up to four lbs. in weight. Crystallization, isometric; lustre, resinous; color, wax-yellow to brown; streak, pale ocherous yellow; fracture, conchoidal, brittle: it is found with albite, etc., at Chesterfield, Mass., Utö, Sweden, and at the mica mines, Amelia co., Virginia.

MICROLITH, n. *mī′krō-lĭth* [prefix *micro-*; Gr. *lithos*, a stone]: term used in various significations; e.g., as equivalent to *crystallite*, i.e., an aggregation of globular microscopic forms; also as applied to minute forms shaped like a lath or an hour-glass. The latter is now probably the most frequent application of the term.

MICROLITHIC, a. *mī′krō-lĭth′ĭk* [Gr. *mikros*, small; *lithos*, a stone]: formed of small stones.

MICROMETER, n. *mī-krŏm′ĕ-tėr* [Gr. *mikros*, small; *metron*, a measure]: instrument employed in measuring small objects, spaces, or very small angles formed by bodies at a remote distance. MI′CROMET′RICAL, a. *-mĕt′-rĭ-kăl*, pertaining to the micrometer. MICROM′ETRY, n. *-ĕ-trĭ*, the art of measuring minute objects or angular distances with a micrometer.—The *Micrometer* is of different forms, depending on different principles: these forms may be divided into two sections, according as they are applied to Physics or Astronomy. Of the former section are the Vernier (q.v.) and the Micrometer Screw, the latter instrument being merely a screw with a very regular thread, and a large round head, which is carefully graduated, generally to sixtieths, and furnished with an index. It is easily seen that if a complete turn of the screw advance its point $\frac{1}{20}$ of an inch, a turn sufficient to pass the index from one graduation to another will only advance it $\frac{1}{1200}$ of an inch, etc. This is the micrometer used in the construction and graduation of instruments. Of those applied to astronomical purposes, the most simple is a short tube, across the opening of which are stretched two parallel threads, or very fine wires, or spider-lines, which are moved to or from each other by screws. These threads are crossed

by a third perpendicularly, and the whole apparatus is placed in the focus of a lens. The distance of two stars is found by adjusting the two parallel threads, one to pass through the centre of each star, taking care that the threads are placed perpendicular to the line joining the stars, and finding how many turns and parts of a turn of the screw are required to bring the wires to coincide. The angle of position of two stars also is obtained by turning round the instrument till the third wire, which is normally horizontal, bisects both stars, and reading off on the circumference the arc passed over. *Fraunhofer's suspended annular micrometer* consists merely of a steel ring surrounded by a flat rim of glass, and the position of the star is deduced from the time when it crosses the ring and its path while within it. The Abbé Rochon substituted for the wire micrometer one made of two prisms of rock-crystal or Iceland spar, capable of double refraction.

MICROMETER SCREW: in optics, a screw attached to instruments for exact measurement of very small angles. The great space through which the lever of the screw passes, in comparison with the longitudinal motion due to the pitch, affords the means for a positive motion which is imperceptible on the object moved, though appreciable in its results.

MICRON, *mī'kron* [Gr. 'very small']: a unit of length equal to the millionth part of a metre, or the 25,400th part of an inch. It is much used among physicists in connection with precise measurements, and has been officially sanctioned by the International Commission of Weights and Measures. The Greek letter μ is used as its symbol. Thus '47 μ' is read 47 microns. The names 'bicron' and 'tricron' have been proposed, respectively, for the billionth and trillionth part of a metre, but they have not been generally adopted, and probably will not be. Etymologically, at least, they are monstrosities.

MICRONESIA, *mī-krō-nē'shĭ-a:* the name given to a large number of islands in the Pacific Ocean, the natives of which have a light skin as distinguished from Melanesia (q.v.), the inhabitants of which are dark-skinned. The islands extend southward from Japan to New Guinea, the chief groups comprising the Gilbert Islands, Marshall Islands, Carolines, Pelew Islands, and the Ladrones (q.v.).

MICRONOMETER, n. *mī-krō-nŏm'ē-tėr* [a contraction of *microchronometer*]: kind of watch intended for measuring short intervals of time, e.g., the flight of a projectile, etc. After being wound up in the ordinary way, it is set in motion by pressing a spring with the finger, upon withdrawing which it is instantaneously stopped.

MICROPHONE, n. *mī'krō-fōn* [Gr. *mikros*, small; *phonē*, a sound]: an electrical instr. for reproducing, and rendering with vastly increased and startling distinct-

ness, very minute and inaudible sounds—e.g., the tick of a watch or the tread of a fly—at almost any distance from its original source, in connection with the telephone. The principle of this instrument was discovered by Prof. David E. Hughes, an American resident in London, who announced the discovery in a paper delivered before the Royal Society, London, in 1878. The microphone, as the name implies, largely amplifies sounds. It consists of a vertical carbon pencil pivoted loosely at both ends in solid carbon receptacles which are fastened to a thin sounding-board, which board is suitably upheld by one edge on a solid block or base. When the carbon pencil is made part of an electric circuit in which are also a small battery and a telephone receiver, sounds are many times amplified; even a small cotton ball dropped on the block is heard in the telephone like a bullet falling on the floor. A number of theories have been advanced to explain the action of the microphone; one, adopted by the courts in this country in a case in which the validity of the Berliner telephone transmitter was an issue, being that the action is due to the remarkable effect of sonorous vibrations in varying the electrical resistance at a loose contact between solid electrodes. The most common form of carbon telephone transmitters in use today are varieties of the microphone. It may be added that Prof. Hughes gave this instrument to the world gratis. The principle of the microphone has also been utilized in a stethoscope. MICROPHON'ICS, n. *-ĭks*, the science or art of augmenting weak or small sounds.

MICROPHOTOGRAPHY, n. *mī-krō-fō-tŏg'ra-fĭ* [prefix *micro-;* Eng. *photography*]: photographic process by which an object is reduced in size, while its exact form is retained. By means of this instrument letters can be reduced to a minute space, and afterward either enlarged by photography or read with a microscope. Practical use of the process was made during the siege of Paris in 1870, in order to communicate with those inside that city by means of messages conveyed by carrier-pigeons, the transcript being taken on paper of extreme thinness, so that the pigeons were able to carry a considerable number of messages.

MICROPHYLLINE, n. *mī'krō-fĭl'lĭn* [Gr. *mikros,* small; *phullon,* a leaf]: a material composed of minute leaflets or scales.

MICROPHYTA, n. plu. *mī-krŏf'ĭ-tă,* or MICROPHYTES, n. plu. *mī'krō-fīts* [Gr. *mikros,* small; *phuton,* a plant]: in *geol.,* a term applied to minute forms of vegetable life; microscopic plants. MI'CROPHY'TAL, a. *-fī'tăl,* applied to deposits of minute forms of life, chiefly of vegetable origin.

MICROPYLE, n. *mī'krō-pīl* [Gr. *mikros,* small; *pulō,* a gate]: in *bot.,* the opening or foramen of the seed for the escape of the root of the embryo.

MICROSCOPE, n. *mī′krō-skōp* [Gr. *mikros*, small; *skopĕō*, I view]: instrument for viewing minute objects by magnifying them. Mi′croscop′ic, a. *-skŏp′ĭk*, or Mi′croscop′ical, a. *-ĭ-kăl*, very small; visible only by the aid of a microscope. Mi′croscop′ically, ad. *-lĭ*. Microscopist, n. *mī-krŏs′kō-pĭst* or *mī′krō-skŏp′ĭst*, one who is skilled in the use of a microscope. Microscopy, n. *mī-krŏs′kŏ-pĭ*, the use of the microscope; investigations with the microscope.

MI′CROSCOPE: instrument for use in examining objects so small as to be almost or quite undiscernible by the unaided eye. Its early history is obscure; but as it is quite evident the property of magnifying possessed by the lens must have been noticed as soon as it was made, we are quite safe in attributing its existence in its simplest form to a period considerably anterior to the time of Christ. It is generally believed that the first compound M. was made by Zacharias Jansen, a Dutchman, 1590, and was exhibited to James I. in London by his astronomer, Cornelius Drebbel, 1619. It was then very imperfect, coloring and distorting all objects. For many years, it was more a toy than a useful instrument, and it was not until the invention of the achromatic lens by Hall and Dollond, and its application to the M. by Lister and others, that it reached its present advanced position among scientific instruments.

An object to be magnified requires simply that it be brought nearer to the eye than when first examined; but as the focal distance of the eye ranges from 6 to 14 inches —10 inches being the average focal distance—it follows that a limit to the magnifying power of the eye is attained whenever the object to be examined is brought so near. If, however, we blacken a card and pierce a hole in it with a fine needle, and then examine a minute object, as, for instance, the wing of an insect held about an inch from the card, we shall see it distinctly, and that too, magnified about ten times its size. This is explained by the fact that the pin-hole limits the divergence of the pencil of rays, so that the eye can converge it sufficiently on the retina to produce a distinct impression, which is faint; and did not the blackened card exclude all other light, it would be lost. If we now remove the blackened card without either removing our eye or the object under examination, it will be found that the insect's wing is almost invisible, the unassisted eye being unable to see clearly an object so near as one inch; thus demonstrating the blackened card with the needle-hole in it to be as decided a magnifying instrument as any set of lenses.

By the apparent size of an object is understood the angle formed by two lines drawn from the centre of the eye to the extremities of the object, which is larger when the object is nearer the eye than when further removed. This angle is called the angle of vision, and is quite distinct from the angle of the pencil of light, by which the object is seen. The focal length of a lens determines its

magnifying power. The object to be examined is placed in its focus, so that the light which diverges from each point may, after refraction by the lens, proceed to the eye in lines as nearly parallel as is necessary for distinct vision. Thus, in fig. 1, AB is a double convex lens, in the

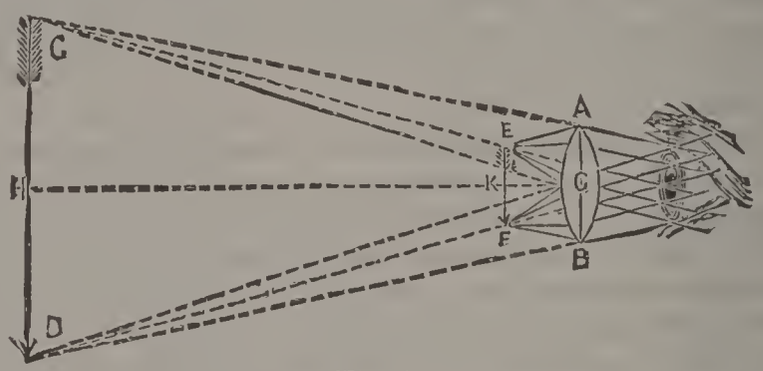


Fig. 1.

focus of which we have drawn an arrow, EF, to represent the object under inspection. The cones drawn from its extremities are portions of the rays of light diverging from these points and falling on the lens. These rays, if not interrupted in their course by the lens AB, would be too divergent to permit their being brought to a focus upon the retina by the lenses which constitute the eye. But as they are first passed through the lens AB, they are bent into nearly parallel lines, or into lines diverging from some points within the limits of distinct vision, as from CD. Thus bent, these rays are received by the eye as if proceeding from the larger arrow CD, which we may suppose to be ten inches from the eye, and then the ratio of the length of the virtual image to that of the real arrow (nearly 10 to 1) gives the magnifying power of the lens in question. The ratio of CD to EF is the same as that of HG to KG. Now, HG is the distance of distinct vision, and KG the focal length of the lens, so that the magnifying power of a lens is obtained by dividing the distance of distinct vision (ten inches for most individuals) by its focal length. Thus, if the focal length of a lens be $\frac{1}{4}$ inch, the magnifying power is $\frac{10}{\frac{1}{4}} = 40$. This supposes that the distance between the eye and the lens is so small as not materially to interfere with the correctness of this statement.

We have supposed the whole of the light to enter the eye through the lens AB (fig. 1), but it must now be stated that so large a pencil of light passing through a single lens would be so distorted by its spherical figure, and by the chromatic dispersion of the glass, as to produce a very indistinct and imperfect image. This is so far rectified by applying a stop to the lens, so as to allow only the central portion of the pencil to pass. But while such a limited pencil would represent correctly the form and color of the object, so small a pencil of light is unable to bear diffusion over the magnified picture, and is therefore incapable of displaying those organic markings on

animals or plants which are often of so much importance in distinguishing one class of objects from another. Dr. Wollaston was the first to overcome this difficulty, which he achieved by constructing a doublet (fig. 2), which consists of two plano-convex lenses, having their focal lengths in the proportion of 1 to 3, and placed at a distance best ascertained by experiment. Their plane sides are placed toward the object, and the lens of shortest focal length next the object. By this arrangement, the distortion caused by the first lens is corrected by the second, and a well-defined and illuminated image is seen. Dr. Wollaston's doublet was further improved by Mr. Holland, who substituted two lenses for the first in Dr. Wollaston's doublet, and retained the stop between them and the third. This combination, though generally called a triplet, is virtually a doublet, inasmuch as the two lenses accomplish only what the anterior lens did in Dr. Wollaston's doublet, though with less precision. In this combination (fig. 3) of lenses, the errors are still further reduced by the close approximation of the lenses to the object, which causes the refractions to take place near the axis; and thus we have a still larger pencil of light transmitted, and have also a more distinct and vivid image presented to the eye.

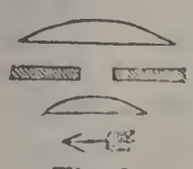


Fig. 2.

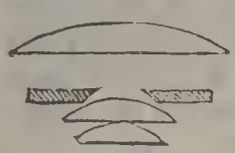


Fig. 3.

Simple Microscope.—By this term is meant an instrument by means of which we view the object through the lens directly. These instruments may be divided into two classes—those simply used in the hand, and those provided with a stand or frame, so arranged as to be capable of being adjusted by means of a screw to its exact focal distance, and of being moved over different parts of the object. The single lenses used may be either a double convex or a plano-convex. When a higher power is wanted, a doublet, as above described, may be employed, or a Coddington lens, which consists (fig. 4) of a sphere in which a groove is cut and filled up with opaque matter. This is perhaps the most convenient hand lens, as it matters little, from its spherical form, in what position it is held. In the simple M., single or combined lenses may be employed, varying from a quarter to two inches. There are many different kinds of stands for simple microscopes made, but as they are used principally for dissection, the most important point next to good glasses is to secure a firm large stage for supporting the objects under examination. When low powers alone are used, the stage-movements may be dispensed with; but when the doublet or triplet is employed, some more delicate adjustment than that of the hand is necessary.

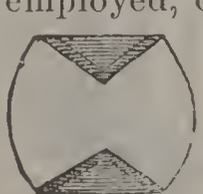
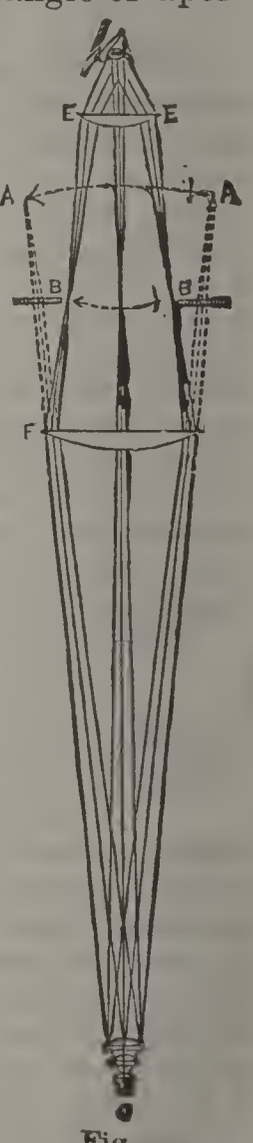


Fig. 4.

Compound Microscope.—In the compound M. the observer does not view the object directly, but an inverted image or picture of the object is formed by one lens or

set of lenses, and that image is seen through another lens. The compound M. consists of two lenses, an object and an eye lens; but each of these may be compounded of several lenses playing the part of one, as in the simple M. The eye-lens is that placed next the eye, and the object-lens that next the object. The former is called also the ocular, and the latter the objective. The object-glass is generally made of two or three achromatic lenses, while the eye-piece generally consists of two plano-convex lenses, with their flat faces next the eye, and separated at half the sums of their focal lengths, with a diaphragm or stop between them. Lenses of high power are so small as to admit only a very small beam of light, and consequently what is gained in magnifying power is often worthless from deficient illumination. Various devices have been employed to overcome this difficulty. The light may be concentrated by achromatic condensers placed beneath the stage, or the curvature of the lens may be such as to allow as large a number of divergent rays as possible to impinge upon it. Such a lens is said to have a large 'angle of aperture,' the angle of aperture being that made by two lines converging from the margins of the lens to its focal point. Recently lenses, termed 'immersion lenses,' have been constructed of such a curvature that, when immersed in a drop of water placed over the object, light is admitted on all sides. With an immersion lens, there is high magnifying power with sufficient illumination.



Fig

The following diagram (fig. 5) explains the manner in which the compound M. acts. We have here represented the triple achromatic objective, consisting of three achromatic lenses combined in one tube, in connection with the eye-piece, which consists of the field-glass FF and the eye-glass EE. Three rays of light are represented as proceeding from the centre, and three from each end of the object. These rays would, if not interfered with, form an image at AA; but coming in contact with the field-glass FF, they are bent, and made to converge at BB, where the image is formed, at which place a stop or diaphragm is placed to intercept all light, except what is required to form a distinct image. From BB, the rays proceed to the eye-glass exactly as they do in the simple M., and as explained in fig. 1. The image, therefore, formed at BB is viewed as an original object by an observer through the eye-piece EE. The lens FF is not essential to a compound M.; but as it is quite evident that the rays proceeding to AA

would fall without the eye-lens EE, if it was removed, and only a part of the object would thus be brought under view, it is always made use of in the compound M.

A mirror is placed under the stage for reflecting the light through the object under observation. This method of illumination by transmitted light is used when the object is transparent. When opaque, light is reflected on the object by a bull's-eye lens, called a condenser. The best instruments are supplied with six or seven object-glasses, varying in magnifying power from 20 to 2,500 diameters. The eye-pieces supplied are three in number, each of which consists of two plano-convex lenses, between which a stop or diaphragm is placed, half-way between the two lenses. As the magnifying power of a compound M. depends on the product of the magnifying powers of the object-glass and the eye-piece, it follows that its power may be increased or diminished by a change in either or both of these glasses. In the mechanical arrangements, it is of importance to have the instrument so constructed that, while every facility is afforded for making observations and easy means of adjustment, there should also be great steadiness, without which, indeed, no satisfactory results will be obtained. These ends are achieved in various ways, of which fig. 6 is one of the simplest: *a*, brass stand, supported on three feet; *b*, mirror, supported on trunnions; *c*, diaphragm, pierced with circular holes of various sizes, to regulate the admission to the object of reflected light from the mirror; *d*, stage-plate, on which the object is placed; *e*, screw, with milled head for fine adjustment; *f*, the object-glass or objective; *g*, brass tube, in which the body of the instrument is moved, to effect the coarse adjustment; *h*, the eye-piece or ocular. See SOLAR MICROSCOPE.

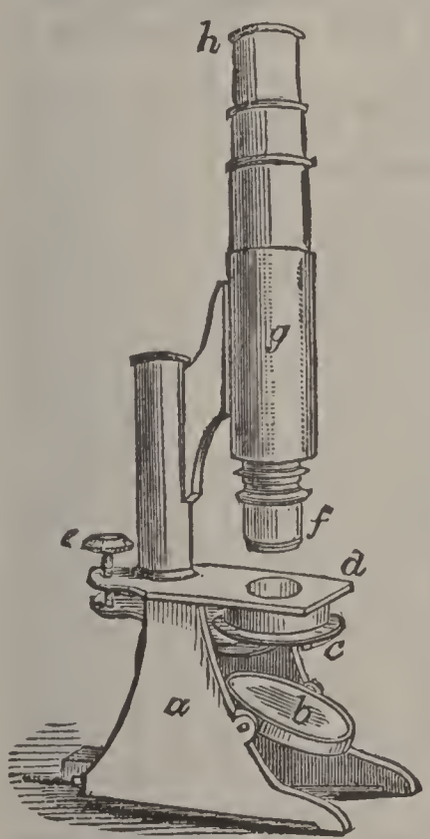


Fig. 6.

The M. has now become so important an instrument in education that almost every department of science in which it can be employed has a M. suited to its particular kind of work, and a special treatise explaining and illustrating its use; and many branches of science have instruments peculiarly their own. Thus, chemists, anatomists, zoölogists, etc., have each a special M. From this instrument the chemist, and natural philosophers generally, have derived great assistance in studying the different kinds of crystals; for, by means of it, they can not only observe and recognize the great variety of forms

that exist, but at any moment, and with little trouble, they may witness the process of crystallization, and leisurely study it. Those sciences in which it is most used, and for which it has done most, are anatomy, physiology, botany, zoölogy, medicine, mineralogy, and geology. In the practice of medicine, all medical men who aim at a scientific treatment of disease have fully recognized its usefulness as an agent in diagnosis, especially in diseases of the kidneys. In the detection of crime and the vindication of innocence, it is no less useful, as by means of it it is possible to determine with certainty whether a suspicious stain, found, e.g., on the clothing of an individual charged with murder, has been caused by blood or by another coloring-matter. In like manner, it can be determined whether hair found in similar circumstances belongs to a human being or not. The M. makes it possible also to distinguish the difference between substances that have a similar chemical reaction (e.g., the various kinds of starch, as flour, potato, sago, etc.); and thus we are provided with an agent quick in detecting adulteration.

Amateur observers choosing an instrument should remember that the simpler it is the better. The essential point is to have good glasses, which are tested by their power of showing some very minute markings, such as we find on diatoms. The circumference of the field of view should not be tinged with color, and the definition should be as good at the edge as at the centre. The beginner should use low powers in preference to high ones. The best light is that reflected from a white cloud during the day. Artificial light should, if possible, be avoided. The table must be steady on which the microscope is placed, and when not in use the instrument should be covered by means of a glass shade. The observer also requires a few oblong glass slides and a few circles of thin glass, called covering-glasses, to lay over the preparation under examination. For making sections, dissecting, and the various manipulatory operations attending the use of the M., he requires, moreover, a pair of forceps, a knife, or, perhaps better, a razor ground flat on one side, a few needles fixed in handles, and two or three hair-pencils. So equipped, the observer is able to begin examinations of texture at once with pleasure and advantage. Begin with simple objects, such as pollen and thin slices of the cuticle of flowers, mosses, and different kinds of starch, such as *tous le mois*, buck yam, cycas, arrow-root, etc., and notice particularly their different characters. Make as thin a section as possible, place it on the centre of the slide, and allow a drop of water to fall on it from the end of the handle of the needle. Then allow the covering-glass to fall gently on it—obliquely, so as to press out any small bubbles of air. Also have near a few bottles containing 'reagents,' such as dilute acetic acid (equal parts of pyroligneous acid and water) and liquor potassæ: by means of these reagents, peculiarities of structure may often be observed.

For a more complete account of the different kinds of microscopes, and the various purposes to which they are applied, see Quekett, *On the Microscope* (1855); Carpenter, *The Microscope* (1862; 6th ed. 1880); works on the microscope by Hogg and Beale; *The Microscopist*, by Wythe (3d ed. 1877).

MICROSCOPES, PROJECTION, AND THEIR USE: A microscope is a device which consists, essentially, of one or more glass lenses and assists the eye in seeing minute objects. In using a simple or compound microscope the light from the object passes through the lenses directly into the eye of the observer. A projection microscope differs from an ordinary simple or compound microscope in that the light from the object, after passing through the instrument, is focused upon a screen where the magnified picture of the object may be viewed by the eyes of hundreds of observers at the same time. In this general sense all stereopticons and other devices for producing magnified pictures on screens are projection microscopes. The term, however, is restricted in use to include only the instruments which are adapted by their lenses for use with small or microscopic objects or parts of larger ones (Fig. 2), and make them visible on a screen (Figs. 1, 5, 6).

It is evident, therefore, that projection microscopes, like stereopticons, must be used in darkened rooms. How to obtain a satisfactory light is the first and most difficult problem in practical microprojection, as the following considerations demonstrate. In using a compound microscope a large proportion of the light passing through the lenses enters the eye of the observer and falls directly upon a small area—say, one-fifth of a square inch—of the sensitive retina, and, therefore, a brilliant light is not needed on the object. In pictures projected on a screen the light passing through the projection microscope may make a picture 10 ft. or more in diameter (Fig. 1), and have an area of 56,548 times one-fifth of a square inch. Or, stated in another way, the picture of a single cell of a plant has been magnified 8,800 diameters on the screen when using an electric arc-light. In this case the area of the picture of the cell was $8,800 \times 8,800 = 77,440,000$ times the area of an optical section of the cell. Moreover, the light falling upon the screen is absorbed, in part, and the portion reflected to the eyes of the observers is weakened by diffusion. Projection microscopes, therefore, require an intensely brilliant light on the objects which are to be shown, and the light must be stronger in proportion to the increase in the magnification of the projected picture. Sunlight, thrown into a darkened room by a porte-lumière or heliostat, is the most powerful and best light when available. A 90° electric arc-lamp consuming about 15 amperes of current is the most useful and generally available source of light for microprojec-

tion. The best oxyhydrogen lights are usable with low powers and the more transparent objects, but cost more per hour than the electric arc-light.

How to concentrate the light upon the object so as to develop the maximum efficiency of the illuminant is the second practical problem in microprojection. It is most successfully solved by using a series of plano-convex lenses, called condenser lenses or condensers, in the manner shown in Fig. 2. Light radiates from the illuminant, passes in succession through a thick, medium and thin condenser, then through a cooling tank and, in some cases, through a sub-stage condenser to the object which is placed on the stage of the projection microscope. The light which passes through the more or less transparent or translucent object is refracted by the lenses of the projection microscope and focused upon a screen, producing an enlarged picture of the object in its natural colors. The size of the picture of any object on the screen may be varied (1) by using projection objectives of different magnifying powers, (2) by using in connection with the objective an eyepiece, or amplifier, and (3) by varying the distance between the projection microscope and the screen, shorter distances giving smaller but more brilliantly lighted pictures. If sunlight is used, instead of electric arc or oxyhydrogen light, only one large condenser of 6½ in. focus and a substage condenser are needed for concentrating the parallel solar rays upon the object. All other details of adjustment and manipulation are the same for all lights.

Details of lesser, but practical, importance may be briefly summarized. Electric currents, either direct, which is preferable, or alternating, of any voltage between 52 and 220 are most satisfactory for all projection work, and require rheostats adapted to the current and lamp. When the oxyhydrogen light is used, a cylinder of lime and the gas jet are substituted for the carbons of the arc-light (Fig. 2), all other details being

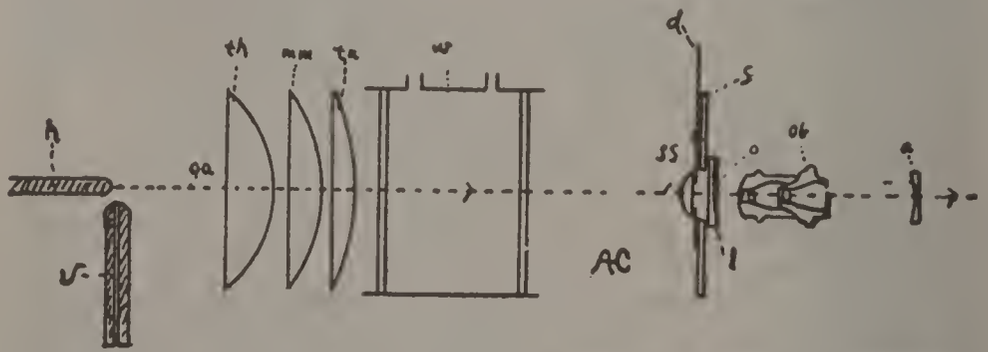
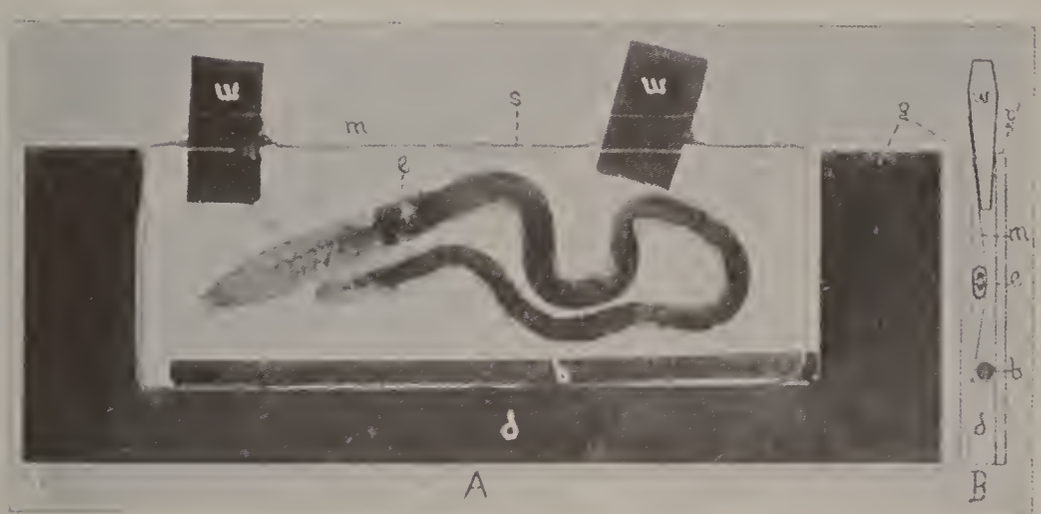
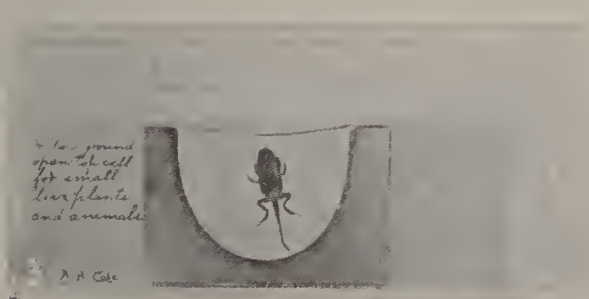


Fig. 2. Essentials of a Projection Microscope Using a 90° Electric Arc-lamp.

(Diagram of vertical section along the optical axis.) *h*, horizontal carbon; *r*, vertical soft-cored carbon; *oa*, optical axis of the condensers and microscope; *th*, thick; *mm*, medium, and *tn*, thin condensers; *w*, cooling tank; *ss*, substage condenser; *d*, diaphragm; *s*, stage of projection microscope; *o*, object, in live-cell *c*; *ob*, projection objective, and, *a*, amplifier.

PROJECTION MICROSCOPE.





For description see opposite page.

PROJECTION MICROSCOPE.

DESCRIPTION OF ILLUSTRATIONS.

FIG. 1. A FRESH-WATER HYDRA AS SHOWN ALIVE BY A PROJECTION MICROSCOPE.* Sunlight was used with a low power (1-inch) microscopic objective. The tentacles of the *Hydra* measured one-fourth inch from tip to tip, while the corresponding measurement of their picture was nearly nine feet. The lecturer, standing close to the screen, was pointing out the mouth of the *Hydra* at the instant the photograph was taken.

*Figs. 1–6 from '*Manual of Biological Projection and Anesthesia of Animals*,' by A. H. Cole (Copyright 1907) by permission of A. H. Cole, Chicago, Publisher.

FIG. 3. TADPOLE MOUNTED IN WATER IN A GLASS CELL FOR PROJECTION. This most useful cell is 3x1 inches in size and B and C show its shape. It is a microscopic aquarium in which small animals and plants will live for days ready to be projected at any moment.

FIG. 4.—(A) AN EARTHWORM, ALIVE AND ANESTHETIZED, MOUNTED FOR PROJECTION IN COLE'S COMPRESSOR CELL. (B) DIAGRAM OF A VERTICAL SECTION OF THE CELL.—The earthworm, *e*, compressed to about one-half its normal thickness by the pressure of a flexible sheet of clear mica, *m*, which is held against the inside of the front glass, *g*, at the bottom of the cell by the brass wire, *b*, and against the top of the same glass, by the wedges, *ww*. The front and back of the cell, *gg'*, are three by one inch microscopic object slides, cemented on strips of window glass, *d*, about one-eighth inch thick. The cell is filled with chloretone anesthetizing solution to the level, *s*. The worm was alive and its 'hearts' were beating vigorously when photographed. The line from *e* terminates just above the gizzard which was half filled with food and grains of sand. The crop is the dark mass at the left of the gizzard and the stomach-intestine begins at the right side of the gizzard, as seen in the picture, both appearing black on account of the food which they contained. The curved line above the gizzard is the dorsal blood-vessel. At the left of the crop the dorsal blood-vessel gives off six pairs of pulsating vessels, the 'hearts,' which extend around the esophagus. The buccal sac is protruded from the mouth in the form of a funnel, as in the act of eating. The 'brain' is just back of the mouth on the dorsal side of the pharynx.

FIG. 5. OPTICAL SECTION OF HEAD AND PROTHORAX OF A NYMPH OF DRAGON-FLY (*AGRION*).

The live nymph was anesthetized and projected on a screen for class study. The large dark spots are the compound eyes and the brain is seen as a broad shaded portion connecting the eyes, and in it are seen fine dendritic branches of the tracheae, or air tubes, which show as black lines. Each compound eye would about cover a period used in the punctuation of this book, but the magnified facets of each eye were visible at a distance of 30 feet from the screen. The blood was seen flowing in the antennæ and legs.

FIG. 6. A GREEN PLANT (*ELODEA*) EVOLVING OXYGEN UNDER THE STIMULUS OF LIGHT FROM AN ELECTRIC ARC-LAMP IN A STEREOPTICON.

A vigorous tip was cut from *Elodea* growing in an aquarium, mounted in Cole's hollow-ground cell (Fig. 3) and projected with a 'quarter size' stereopticon lens, as are lantern slides.

The bubble of oxygen at the cut end of the stem was evolved while the photograph was being made of the plant as it appeared on a screen. The cells of the green leaves were visible in the vivograph.

unchanged. The illuminant must be adjustable at any point between 2½ and 5 in. from the face of the nearest condenser and be freely movable up, down, right, and left, so as to be easily centered in the optical axis of the condensers and microscope. Three plano-convex condensers 4½ in. in diameter are placed close to each other with their plane sides toward the light; the first from the light has a focal length of 5½ in., the second of 6½ in., and the third of 10½ in. The cooling tank has plane glass faces and should be filled with distilled water or clear saturated solution of alum in water, for absorbing heat which might injure the objects or projection lenses. The projection microscope should be adjustable through a distance of 10 in. measured from the cooling tank to allow necessary adaptations of distance for projection lenses of different powers and to regulate the intensity of light which falls on objects of different degrees of transparency. The better grades of ordinary microscopic objectives and special projection objectives of all powers up to and including one-twelfth in. oil immersion objectives may be used in microprojection. The object to be projected is placed on the stage of the microscope a little beyond the principal focus of the system of condensers, a point easily determined by diffusing smoke or chalk dust in the converging rays. With objectives of powers higher than ½ or ⅔ in. a plano-convex lens 1 in. in diameter and of $\frac{13}{16}$ in. focus is used to increase the light in the picture. Eyepieces are not necessary but may be used to increase the magnification, though a plano-concave lens used as an eyepiece and called an amplifier increases the size of the picture with less loss of light.

A summary of some of the types of objects and the chemical, physical, and vital phenomena which are regularly projected for class study and for illustrating lectures will indicate the wide range of usefulness of projection microscopes. A chemical test of a food is demonstrated by projecting white potato and testing its starch grains with iodine, and the effect of digestive juices by comparative tests of cooked potato without and after its treatment in fresh saliva. Starch in raw white potato may be cooked by the heat in the light that shows the entire process on the screen. The immediate effect and absolute necessity of sunlight, or electric arc-light, in the manufacture of starch and evolution of oxygen by green plants is one of the easiest of all demonstrations (Fig. 6), and may be varied to show the effects of minimum temperatures, i. e., frost and freezing, and maximum temperature. Projected pictures which show vital phenomena, e.g., the evolution of oxygen by a live plant (Fig. 6), or the various animal activities recorded below are called vivographs. Small and even microscopic live animals and plants of hundreds of species of common occurrence may be mounted in glass cells of

various shapes and sizes (Figs. 3 and 4), usually in clear water, and their projected vivographs show the curious forms, peculiar movements, instructive anatomical details, and many usually unseen vital phenomena of the live organisms with an accuracy of detail and color unattainable in photographs, lantern slides, or charts. The effects of anesthetics, especially of chloretone (see Anesthesia of Animals and Plants), which is peculiarly well adapted to use on lower animals and plants, is demonstrated whenever an active organism is quieted by its use so that its vivograph may be accurately observed or photographed (Figs. 3-5). Animals catching prey and swallowing it are points of interest in projected fresh-water *Hydra* (Fig. 1) and nymph of the dragon-fly *Agrion* (Fig. 5). The structure of the alimentary canal and the movements of the muscular gizzard in grinding food are seen in projected earthworms (Fig. 4). The flow of the blood is readily shown in tadpoles (Fig. 3), tail of goldfish, foot of frog, and antennæ and legs of small crayfish. The beating of the heart is readily demonstrated in small earthworms (Fig. 4), small flat-spiral pond-snails, and the water-flea, *Daphnia.* Movements of the valves of the heart is a difficult, but possible, demonstration with the water-flea, *Daphnia pulex,* and nymph of dragon-fly, *Agrion.* Asexual development is shown in budded *Hydras,* and the development of the embryo in the egg may be followed for days through all its stages with the eggs of pond-snails. The different stages in the metamorphosis of insects, e.g., mosquitoes, and of frogs, furnish instructive vivographs. The projection of the method of killing mosquitoes with oil on water is a practical lesson in sanitary science. The amount and variety of material available for successful use with projection microscopes is unlimited. Complete details of apparatus and methods of collecting, mounting, cell making, anesthetizing, and projecting numerous typical species are given in Cole's *Manual of Biological Projection and Anesthesia of Animals.*

MICROSCOP'IC ANIMALS. See ANIMALCULE.

MICROSCOPY, CLINICAL: the use of the microscope in the diagnosis of disease. Consumption of the lungs may be microscopically diagnosed by an examination of the sputum, though the patient be 1,000 miles away, and in the same manner a number of diseases of allied forms may be recognized by certain minute evidences interpretable by the microscope. The most important of the intestinal parasites that can be thus identified are the tapeworm, roundworm, hookworm, flukeworm, and pinworm. In all of these the physician, by a microscopical examination of the fæces, can detect the presence of the eggs of the different kinds of worms and the precise kind of worm can be known by the characteristic configuration of the eggs. Examination of the

fæces by the microscope can further detect various forms of indigestion and various kinds of inflammation in the intestinal tract. The influenza bacillus, the bacillus of diphtheria, the organism of cholera, of dysentery, of malignant pustule, of blood-poisoning, of pneumonia, of actinomycosis, etc., can all be identified by a microscopical examination, as also can a number of diseases due to animal parasites in the body, other than intestinal worms. The presence of *Trichina* in the body can also be learned by the peculiar changes that take place in the blood, and the blood-parasite *Filaria* is recognizable under the microscope. There are many blood-diseases which can be diagnosed by simple examination. Anæmia and pernicious anæmia are important examples. Moreover, most of the acute infectious diseases cause certain changes in the blood which may be utilized in microscopical work for diagnostic purposes. Microscopical examination of the urine has long been practiced. By it various forms of disorder of the bladder and of the kidneys can be told, and both renal disease and bladder-disease can be detected long before such troubles become chronic and dangerous. In much the same manner the microscope can be used to examine other secretions and excretions of the human body.

MICROSPORANGIA, n. *mī'krō-spō-răn*j*'ĭ-ă* [Gr. *mikros,* small; *spora,* seed; *anggos,* a vessel]: in *bot.,* cells or thecæ containing microspores.

MICROSPORES, n. plu. *mī'krō-spōrz* [Gr. *mikros,* small; *spora,* seed]: in *bot.,* small reproductive spores in the capsules of Lycopods; applied to certain vegetable parasites present in various cutaneous affections—also in same sense, MICROSPO'RON, n. *-spō'rŏn.*

MICROSTYLAR, a. *mī-krō-stī'lėr* [prefix *micro-;* Eng. *stylar*]: in *arch.,* having a small style or column; an epithet applied to a style of architecture in which there is a separate small order to each floor.

MICROTASIMETER, *mī-krō-ta-sĭm'ĕ-tėr:* instrument for measuring very minute variations of pressure in bodies, caused by changes of temperature, moisture, etc.; invented by Thomas A. Edison. It is based on the combined principles of the pyrometer, hygrometer, and barometer. It was successfully used during the solar eclipse of 1878 and since for measuring the heat given forth by the sun's corona. It is used also to note the variations of temperature, caused by clouds passing over the sun's disk, or by increase or decrease of moisture. Its peculiarity consists in the effect which the pressure of the expanding rod has on the electric resistance of a piece of carbon placed in the circuit of a galvanic battery. A rod of vulcanite is used when slight variations of temperature are to be noted. This rod is fixed in a strong frame, kept at an even temperature, with its lower end fitted into a slot in a metal plate which rests on a carbon button. This button is an electric circuit which includes

a galvanometer. The least variation in the length of the rod, caused by its expansion owing to the heat rays being centred upon it by means of a kind of funnel, changes the pressure on the button and thus the resistance of the current, which is at once indicated by the galvanometer. For use as a hygrometer a strip of gelatine is substituted for the vulcanite.

MICROTHERMS, n. plu. *mī′krō-thermz* [Gr. *mikros*, small; *thermē*, heat]: in *bot.*, plants which require only a small degree of heat to bring them to perfection.

MICROTOME, n. *mī′krō-tōm* [Gr. *mikros*, small; *tomē*, a cutting]: an instrument for making very fine sections for the purpose of being examined under the microscope.

MICROZAMIA, *mī-krō-zā′mĭ-a:* genus of plants of nat. order *Cycadaceæ:* widely diffused over Australia. The fronds resemble those of palms, and are used in the Rom. Cath. Church on Palm Sunday. The underground stem is large and turnip-like, but covered with scales or leaf-scars, and contains a substance resembling tragacanth. The nuts of *M. spiralis* are edible, but are used only in times of scarcity.

MICROZOA, n. *mī′krō-zō′ă* [Gr. *mikros*, small; *zōŏn*, an animal]: a term employed to denote minute animal organisms whose forms can only be defined by the aid of the microscope. MI′CROZO′AL, a. *-ăl*, pertaining to.

MICROZYMES, n. plu. *mī′krō-zīmz* [Gr. *mikros*, small; *zumē*, fermenting matter, leaven]: a general term for very minute organized particles which present themselves in liquids fermenting or undergoing decomposition; the minute organized particles which are supposed to be the contagious matter in zymotic diseases.

MICTURITION, n. *mĭk′tū-rĭsh′ŭn* [L. *micturītus*, having the desire to make water]: the act of making water, or the desire to pass the urine; a too frequent passing of urine in consequence of disease.

MID, a. *mĭd* [Goth. *midja;* Gr. *mesos;* Skr. *madhya;* L. *mediŭs;* Icel. *midr;* Ger. *mittel*, middle: Icel. *midill*, means—from *midla*, to divide]: at an equal distance from the extremes; middle. MIDDAY, n. noon: ADJ. pertaining to noon; meridional. MIDFEATHER, in a *steam-engine*, a vertical water-space in a fire-box or combustion-chamber. MID-HEAVEN, or MID-AIR, the middle part of the heaven or sky; the position of anything raised and suspended considerably above the surface of the earth. MIDLAND, a. being in the interior; distant from the sea. MID-LENT, 4th Sunday in Lent; the middle of Lent. MID-LIFE, the middle of the age of man, or the period of life about 50. MIDNIGHT, 12 o'clock; the middle of the night. MIDRIB, in *bot.*, the principal

nerve or vein, which extends from the base of the leaf to its apex. MID-SHIP, pertaining to the middle part of a ship. MIDSHIPMAN, a junior naval officer in a ship of war or a first-class merchant vessel (see below). MID-STREAM, the middle or centre of the stream. MID-SUMMER, the middle of summer; the time about June 21st. MID-SUMMER'S DAY, one of the quarter-days of the year in England, occurring June 24 (see LANDLORD AND TENANT). MID-SUMMER EVE (see ST. JOHN'S, EVE OF). MIDWAY, a. being in the middle of the way or distance: N. the middle of the distance: AD. half-way. MID-WINTER, the middle of the winter, about Dec. 21; the middle of severe winter weather.

MIDA, n. *mī′dă* [Gr. *midas*, a destructive insect in pulse]: the grub of the bean-fly.

MIDAS, *mī′das:* common representative name in Greek tradition of the more ancient Phrygian kings, of whom M., legendary son of Gordius and Cybele, is the most famous, said to have been pupil of Orpheus. He was closely connected with the cultus of Dionysus or Bacchus, and among the many legends regarding him is one, that Bacchus granted his wish that whatever he touched might become gold; from which so great inconvenience ensued, that he was glad to get relief from the burden by washing, at the command of the god, in the Pactolus, the sands of which became thenceforth productive of gold. Another legend represents him as having offended Apollo by assigning the prize in a musical competition to Pan, and as having therefore been endowed by him with a pair of ass's ears, which he concealed under his Phrygian cap, but which were discovered by his servant. The historical Phrygian monarchy was destroyed by the Cimmerians about B.C. 760, and the last King M. committed suicide.

MI′DAS: genus of platyrhine monkeys, of family *Hapalidæ*, *hăp-ăl′ĭ-dē:* see TAMARIN.

MIDDELBURG, *mĭd′dĕl-bûrĝh:* town of the Netherlands, cap. of the province of Zeeland, in the island of Walcheren. It is connected with the sea by a canal, five m. long, admitting ships of heavy burden, and is a station of the railway from Flushing to Roosendaal to join the Dutch and Belgian lines. The city is nearly circular, and a league in circumference, surrounded by a broad canal. In former times, M. was one of the leading mercantile cities of the United Provinces, sending many ships to the E. and W. Indies, America, and all European ports, founding the colonies of Surinam, Berbice, Essequibo, Demerara, etc.; but the opening of the Scheldt for Antwerp, and other causes, have reduced the foreign trade to single ships to Java. Many of the inhabitants are wealthy, which, with its being the meeting-place of the provincial states of Zeeland, and having considerable trade in grain, salt, etc.—making beer, vinegar, starch, leather, and with snuff, chocolate, oil and saw mills, and foundries—make it still a city of

importance. It is the finest city of the northern provinces, having handsome houses, ornamented with gardens, and the canals and streets shaded with trees. The townhouse, founded 1468, has a beautiful tower, and is decorated with 25 colossal statues of Counts and Countesses of Holland. At the beginning of the 12th c., an abbey was founded, which was, later, enriched by Willem II., Count of Holland and Zeeland. The buildings are now occupied as the meeting-place of the provincial states. Middelburg does not date further back than the 9th c. In 1574 the Spaniards, under Mondragon, were compelled by famine to give up Middelburg, after having defended it 22 months against Prince Willem I. Though troops are stationed in Middelburg, it is no longer tenable against an enemy. Pop. 18,650.

MIDDEN, n. *mĭd'n* [Icel. *moddyngia;* Dan. *mödding,* a dunghill—from Icel. *mod,* refuse; *dyngia,* a heap]: in *Scot.* and *N. of Eng.,* a dunghill; a manure-heap; an ancient deposit or mound of refuse made by man.

MIDDLE, a. *mĭd'l* [from Mid, which see]: equally distant from the extremes; intervening: N. the point or part equally distant from the extremities; the time which passes, or the events which happen, between the beginning and the end. Middle-aged, at about the age of 50. Middle base and Middle chief, in *her.* (see Points of Escutcheon). Middle C, in *music,* the note a fifth above the F or bass-clef, and a fifth below the G or treble-clef. The C clef always represents Middle C. Middle class, a name used to designate the classes of society which include professional men, merchants and traders, bankers, and the like; the classes between mechanics and the aristocracy. Middle-deck, in a ship having three decks, that situated between the other two. Middle ground, in *painting,* the central portion of a landscape. Middle latitude sailing (see Sailings). Middle-man, an agent between two parties; in *Ireland,* one who rents large tracts of land from the proprietor, and lets out small portions to the peasantry. Mid'dle-most, a. in the middle or nearest the middle. Middle passage, in the *slave trade,* the part of the Atlantic ocean lying between Africa and the West Indies. Middle post, in *arch.,* the same as king-post. Middle Temple, one of the four English Inns of Court, having the exclusive privilege of calling persons to the bar (see Inns of Court). Middle term, in *logic,* the term of a syllogism with which the two extremes are separately compared. Middle tint, in *painting,* a mixed tint in which bright colors do not predominate.

MIDDLE ACADEMY: the title of the school which succeeded the Older Academy in the teaching of Plato's doctrines. Arcesilaus and Carneades are generally mentioned as its leaders. They flourished from about 315 to 129 B.C.

MIDDLE AGES: great historic period between the times of classic antiquity and modern times. The beginning and close of this period are not very definite; it is usual, however, to regard the M. A. as beginning with the overthrow of the Western Roman Empire 476; and there is a somewhat general concurrence in fixing on the period of the Reformation, or, with some writers, the revival of learning in Europe, as marking its close. Thus in round numbers, the M. A. may be assigned to the thousand years 500–1500. The Dark Ages (q.v.) is a term still more indefinite, perhaps best applied to a portion of the M. A., about 600–1000. The M. A. began with the rise of the Frankish on the ruins of the ancient Roman Empire, and with the commencement of civilization among the barbarous tribes which had taken possession of the former Roman provinces. During the M. A., the different nations of modern Europe were formed, and their political and social systems developed. It was a period of much superstition; in connection with which religious enthusiasm extensively prevailed, manifested in many great religious endowments, in magnificent ecclesiastical buildings (see GOTHIC ARCHITECTURE), in pilgrimages (see PILGRIM), in monasticism (see MONACHISM), and, above all, in the Crusades (q.v.). In the earlier parts of this period, the church was much occupied in the extension of its bounds in n. Europe, where heathenism still lingered; and the means employed were not always consistent with the spirit of Christianity. During the M. A., the hierarchy acquired enormous power and wealth, and the papacy rose from comparatively small beginnings to its utmost greatness. During the M. A., chivalry had its rise and decline; modifying, and in many respects tending to refine, the feelings and usages of society. Toward the close of the period, the revival of letters, the increase of knowledge, and the formation of a wealthy and leading class in society, distinct alike from the aristocracy and the peasantry, tended, even before the Reformation, both to the diminution of the power of the hierarchy and the decay of the feudal system.—See FEUDAL SYSTEM: CHIVALRY: CRUSADES. See Guizot's *Histoire de la Civilisation;* Rühs's *Handbuch der Geschichte des Mittelalters;* and Hallam's *History of the Middle Ages.*

MIDDLE BASS ISLAND: see PUT-IN-BAY ISLANDS.

MIDDLEBOROUGH, *mĭd'l-bŭr-rŭh:* town in Plymouth co., Mass.; in the s.e. part of the state, on the Namasket river; at the junction of the Cape Cod branch of the Old Colony r.r., the Boston to Provincetown, the Middleborough Taunton and Providence, and the Old Colony and Newport; 12 m. from Plymouth, 20 m. from Fall River, 34 m. from Boston. It is one of the oldest towns in the co., and popular as a summer resort because of its historic associations as well as its picturesque scenery. Before Lakeville was taken from its territory, it was the largest town in the state; it still comprises 60 sq. m., on

both sides of the river, which flows in a winding course from several lakes 5 m. away, and empties into the Taunton r. Its 3 falls furnish excellent water-power, while the lakes abound in fish and afford numerous picnic grounds on their shores. The town comprises the thriving villages of North M. (Titicut), South M., The Rock, East M. (Eddyville), a number of smaller villages, and M. Four Corners, the central portion, known as M. Each of these villages has its churches, post-office, manufactures, etc. The town has several public halls, besides a town-house, containing a large hall, district-court room, a public library, a bank, and the town offices. About a mile from it is Muttock Hill cemetery, where lie buried some of the founders of the colony. M. was the seat of Peirce Acad., a Bapt. classical institution, founded 1808, which, however, has been discontinued, its prosperity having been fatally injured by the civil war. The system of graded public schools is in excellent condition. The town is regularly laid out, well lighted, and abundantly supplied with beautiful shade and ornamental trees, which have helped to make its drives so popular. The post-village of M. has 3 churches, 2 newspapers, a hotel, the Bay State straw-works, employing a large number of girls in its extensive factories and at their homes in the neighboring villages, several shoe factories, the Star woolen mills, manufactories of lumber, shovels, needles, trunks, boxes, and varnish, marble-works, and stores of various kinds. A considerable trade in horses from Vt. and Canada is carried on. Pop. (1890) 6,065; (1900) 6,885; (1910) 8,214.

MIDDLEBURY, *mĭd'l-bĕr-ĭ:* town, cap. of Addison co., Vt., beautifully situated on Otter creek at Middlebury falls; on the Rutland division of the Central Vermont r.r.; 35 m. s. of Burlington, 33 m. s.w. of Montpelier, 33 m. n.w. of Rutland. Surrounded by attractive mountain scenery, it has 6 fine marble quarries, whose white and variegated marbles are exported in considerable quantities. Its excellent water-power runs several cotton and woolen factories; it has also flour mills and iron foundries, besides manufactories of sashes, doors, and blinds, cotton, wool, paper, and leather. It contains several newspapers, 6 churches, 3 hotels, a national bank, a well-organized fire department, has good public schools and a free public library. Pop. (1910) 2,848. MIDDLEBURY COLLEGE, founded 1800, and under the control of the Congregationalists, has its seat here. In 1901-2 it had 11 profs. and instructors, 123 students, 24,895 volumes in the library, scientific apparatus valued at $22,000, grounds and buildings valued at $200,000, productive funds $380,000, total income, excepting board and lodging, $25,000. Ezra Brainerd, D.D., LL.D, was pres., and the college was open to both sexes.

MIDDLE LEVEL: one of the three divisions of the remarkable district of 400,000 acres on the e. coast of England, known as The Fens, or BEDFORD LEVEL (q.v.), which, centuries ago, was converted into an unprofitable marsh by repeated incursions of the sea, together with obstructions to the outward flow of the rivers Nene, Cam, Ouse, Welland, etc. Vast operations have been carried on ever since the time of Charles I., by digging new channels and outfalls, and employing wind-mills and steam-engines to pump the water from the marshes and ponds into these artificial channels. In the M. L. (nearly the whole of whose 130,000 acres between the Nene and the Old Bedford river is about 15 ft. below high-water spring-tides) a notable irruption took place 1862, May 4. St. Germain's Sluice, at the confluence of the M. L. main outfall drain with the river Ouse, near the upper end of another artificial channel, gave way without warning. The rise of high-water spring-tide at that point was 19 ft., and the sill of the sluice was 6 ft. below low-water spring-tide. The tidal waters rushed up the opening, and ebbed and flowed throughout a distance of 20 m. After incessant exertions, the tidal waters were at length, June 19, effectually shut out by a strong coffer-dam, constructed by Hawkshaw, engineer. Another break in the embankment, about 4 m. distant, eight days after the first, admitted a rush of water which covered to a depth of 2 or 3 ft. 6,000 acres of fertile land, increased at successive high tides to 10,000 acres.

For riddance of the flooding waters, and for added outlet to the usual rivers, 16 enormous siphons were provided, to be placed *over* the coffer-dam: they were of cast iron, 3 ft. 6 inches internal diameter; they rested on the top of the dam, and on inclined frame-work supported by piles at the sides. The valves were so arranged that the siphons could be put in operation, either by exhausting the air or by filling them with water. When only six of the siphons were in position, they carried 50,000 gallons of water per minute over the dam.—For details see Hawkshaw's paper, before the Institute of Civil Engineers 1863.

MID'DLE PARK: one of the many fertile valleys, covering broad distances, in Summit co., Colo.; 7,500 ft. above sea-level; inclosed by spurs of the Rocky Mts., in the midst of the most varied and picturesque mountain scenery; 65 m. in length, 45 m. in breadth; about 3,000 sq.m. It is separated from North Park, directly n. of it, by one of the cross ranges of the main chain of the Rocky Mts. On the e. side of it is the Snow Range of mts., or continental divide, and lofty mountains surround it on every side, among which some of the highest and most prominent in the imposing landscape are Long's peak, Gray's peak, and Mt. Lincoln, each 13,000 to 14,000 ft. in height. The tract is watered and made fertile by the head-waters of the Grand river and the Blue river, which both flow w. to the Colorado. Most of the park has the appearance of a beautiful meadow, over whose

carpet of green are scattered wild flowers of brilliant colors and in great profusion; a considerable part, however, is covered with dense forest. Game abounds throughout this region, including bears, elk, deer, antelopes, and mountain sheep; while the waters contain a variety of fish. Its main attraction to tourists, however, seems to be its mild and genial climate and very equable temperature; also its hot sulphur springs. These are near a branch of the Grand r., 45 m. from Georgetown, 60 m. from Central City, about 12 m. from the s. boundary of the park. They are much resorted to by sufferers from rheumatism, neuralgia, and skin diseases. A settlement for the accommodation of invalids is growing into quite a town around these springs. 27 m. from them is Grand Lake, a beautiful sheet of water full of trout and other game fish: it also is a resort of tourists.

MIDDLESBOROUGH, *mĭd'dlz-bŭr-rō:* important market-town, port, and parliamentary borough in the N. Riding of Yorkshire, at the mouth of the Tees, 48 m. n.e. from York. It is the centre of the n. of England iron manufacture. The town is of recent growth, and owes its origin as a port to its convenient position for shipment of coal brought by railway from the mines in s. Durham. In 1842 a commodious dock was constructed, recently much enlarged, and admitting ships of the largest tonnage.

On the discovery, 1840, of immense beds of ironstone, extending through the whole range of the Cleveland Hills, a portion of which are close to the town, the smelting of iron was speedily begun on an extensive scale, since marvellously increased. To smelting have been added iron-foundries, manufacture of rails, locomotive engines, tubes, boilers, etc.; chemical works, potteries, and ship-building also are carried on to a large extent. The town of M. was incorporated 1853, and constituted a parliamentary borough 1868. The Royal Exchange, built 1867, is a large and handsome building; in its spacious interior, the weekly iron market is held. The Corporation Hall contains the custom-house. The high school, built at a cost of £25,000, was given to the town by Mr. Pease, M.P. Albert Park, 72 acres, was given by Mr. Bolckow. A new dock, costing £120,000, was opened 1875; the new cattle market 1876. There are numerous churches, some of them handsome. The jubilee of M. was celebrated 1881; a statue of Mr. Bolckow, one of its founders and chief promoters, being unveiled. In 1831 M. was an obscure hamlet with 383 inhabitants: pop. (1871) parliament. borough 46,643; (1901) 91,317.

MIDDLESEX, *mĭd'l-sĕks:* the metropolitan county of England, in the s.e. of the island; bounded n. by Hertford, s. by Surrey; about 60 m. inland (westward) from the North Sea, with which it communicates by the river Thames. Next to Rutland, it is the smallest of English counties; only 180,136 statute acres; but its popula-

tion is second only to that of Lancashire. The surface is, on the whole, level, with gentle undulations. The Thames, which forms its southern boundary, and its affluents, are the only rivers of the county. Two of these, the Colne and the Lea, form respectively the western and the eastern boundaries of the county. It is traversed by the Grand Junction and Regent's canal, and the New river, an artificial cut intended to supply the capital with water. The soil is in general poor, with the exception of a tract of good fertile loam along the Thames. The land is occupied chiefly for grass and hay farms and market-gardens. The county town is Brentford. Middlesex is subject to the city of London, and the whole county is in the diocese of the Bishop of London. Pop. (1901) 792,225.

MIDDLESEX FELLS, Boston, Mass.: a picturesque hill, wood, and lake reservation of the metropolitan park system of 'Greater Boston,' enclosing Mystic Lakes; area from 3,000 to 3,200 acres. The Fells are part of the townships of Malden, Melrose, and Stoneham.

MIDDLETON, *mĭd'l-ton*, ARTHUR: 1681—1737, Sep 7; b. South Carolina. He was educated in England, and returning, became prominent in colonial affairs. In 1704 he was appointed one of the commissioners to establish the Church of England as the state religion, became naval officer 1711, and was member of the council 1711-19. He exerted his political influence in favor of popular claims, opposing the lords proprietors, and finally heading the revolution which threw off the whole proprietary government and placed the colony under the immediate protection of the crown (1719). In 1725 he succeeded Nicholson as acting governor of the colony, which office he held till 1731, when the royal governor arrived; he then retained his position in the governor's council. His administration as governor was partly occupied by war and negotiations with the Spaniards of Florida and the French of Louisiana.—His father, EDWARD M. (1640—1700), b. England, inherited a large estate, spent some time at Barbadoes, and removed to South Carolina in the early days of the colony. He received a valuable land grant, and became a member of the council and an assistant judge.

MID'DLETON, ARTHUR: 1742, June 26—1787; Jan. 1: b. South Carolina. He studied in England, at Harrow and Westminster, and graduated from Cambridge; travelled in Europe two years; 1763 returned to South Carolina, and the following year married a daughter of Walter Izard. In 1765 he became a member of the commons, a position which he held several years. He visited England 1768, returned three years later, and became a leader in political affairs; was a member of the committee of safety and of the provincial congress 1775, a member of the continental congress 1776, and signed the declaration of independence. In 1778 he was

elected gov. of S. C., but declined. He assisted, 1780, in the defense of Charleston, sustained heavy loss of property, was taken prisoner, exchanged, and returned to congress, where he remained until peace was declared, when he became member of the state senate. He was a skilful stenographer and preserved a record of many important debates. Under the name 'Andrew Marvell' he wrote able political documents. Died at Goose Creek, S. C.—His father, HENRY M. (1717–1784, June 13), was a wealthy planter and zealous patriot; speaker of the commons 1745–47, commissioner of Indian affairs 1755, member of council 1755–70, pres. of continental congress 1774, and of provincial congress of S. C. 1775–6. He was returned to the continental congress, but on account of ill health was unable to serve and was succeeded by his son.

MID'DLETON, CONYERS, D.D.: clergyman of the Church of England: 1683–1750, July 28; b. Richmond, Yorkshire. He studied at Cambridge, where he took the degree B.A. 1702, was elected a fellow 1706, and shortly afterward married a lady of fortune. His life was a series of bitter and, on the whole, not creditable controversies, though he is said to have been rather an agreeable person in private. His first and most formidable opponent was Richard Bentley (q.v.); afterward, his polemics were chiefly theological. The views that he advocated were generally such as to draw on him the imputation of being an 'infidel in disguise,' though some of them—such as, that the Jews borrowed some of their customs from Egypt, and that the primitive writers in vindicating Scripture found it necessary sometimes to recur to allegory—are now established beyond doubt; while his opinion, that the Mosaic narrative of the creation is not literal truth, has since M.'s day been adopted by many of the most learned clergy even of his own church. He seems not to have forsaken any essentials of Christianity, but to have lacked devoutness of temper, to have been too ready for controversy, and to have been naturally suspicious regarding all things that claimed to be supernatural. M. died at Hildersham, in Cambridgeshire. One of his writings was *The History of the Life of M. Tullius Cicero* (2 vols. 1741), a work interesting and valuable, but neither very impartial nor quite accurate. His celebrated *Letter from Rome, showing an exact Conformity between Popery and Paganism; or the Religion of the present Romans derived from that of their Heathen Ancestors* (1729), provoked the most violent indignation among Rom. Catholics, and is still read with interest. All his pamphlets, treatises, etc., were collected and published under the title *Miscellaneous Works* (4 vols. Lond. 1752–57), containing much that is of value.

MIDDLETONITE, n. *mĭd'l-tŏn-īt:* a mineral resin found in the older Coal-formations, and occurring in layers, or in rounded pea-like masses, of a reddish-brown color—so called from *Middleton* collieries, near Leeds, where it was first discovered.

MIDDLETOWN.

MID'DLETOWN: city, county seat of Middlesex co., Conn.; on the w. bank of the Connecticut river and on the New York, New Haven and Hartford railroad; about 15 m. s. of Hartford. It is connected with Portland (noted for its brownstone quarries) on the opposite bank, by a long drawbridge. M. has considerable trade, the river being navigable as far as Hartford for light draught vessels, such as can cross the bar at Saybrook. The city is in an agricultural region, the principal product of which is tobacco, and has manufactories of hardware, silver-plated ware, locks, harness trimmings, rubber goods, silks, pumps, bone goods, hammocks, cotton webbing, etc. In the vicinity are valuable mineral deposits. The city contains public and parish schools, the Wesleyan Univ., the Berkeley Divinity School (P. E.). the State Hospital for the Insane, the State Industrial School for Girls, the Russell Free Library, with 15,000 volumes, a handsome municipal building and numerous churches, banks, etc. M. was founded 1650, was incorporated as Mattabeseck 1651, and received its present name in 1653. It was incorporated as a city 1784 and received a new charter in 1882, under which the city is now governed. This charter provides for a mayor, who holds office two years, and a city council, the subordinate officials being appointed by the mayor and council. Pop. (1890) 9,013; (1900) 9,859.

MID'DLETOWN: city in Orange co., N. Y., near the Wallkill river, e. of the Shawangunk Mts., and w. of the highlands of the Hudson; 24 m. s.w. of Newburgh, 66 m. n.w. of New York on the New York, Ontario and Western, the New York, Susquehanna and Western and the Erie Railroads. It is in a fertile agricultural region, has a large trade in dairy products, live-stock and garden produce, and its chief manufactures are hats, shirts, saws, files, cut-glass, cigars, condensed milk, leather, paper boxes, carpet-bags, printers' supplies, etc. The city also contains the shops of the N. Y., O. & W. railroad. It is the seat of a State Homeopathic Hospital for the Insane, St. Joseph's Academy (Rom. Cath.), the Thrall Public Library, and contains numerous churches, seven public schools, one parish school, an excellent high school, two national, one savings and one trust company banks, with combined capital of $400,000, several public halls, an opera house, hotels, etc. It is regularly laid out, with wide streets, well shaded, lighted, paved and sewered. It has a police force, a board of health, and a fire department. Its supply of water is from Lake Monhagan, 2 m. distant, its reservoir covering 80 acres, nearly 200 ft. above the town. In the s.w. part is Hillside cemetery, 50 acres in extent, beautifully laid out and well kept. The city was settled about the middle of the 18th century, and was at first a part of Wallkill township. It was incorporated as a village 1848, and received its city charter 1889, June 27. The government, under a revised charter of 1902, consists

of a mayor, who holds office two years, and a common council of nine members, elected for two years. The board of health is appointed by the mayor, with the approval of the council; the engineer, city clerk and corporation counsel are elected by the council and other municipal officials are elected by popular vote. Pop. (1900) 14,522; (1910) 15,313.

MID'DLETOWN: city in Butler co., Ohio; on the Miami river, the Miami and Erie canal, and the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, Chicago and St. Louis and the Cincinnati Northern railroads, about 34 m. n. of Cincinnati. It is in an agricultural region, but its chief industries are the manufacture of tobacco, bicycles, agricultural implements, paper, flour, etc. The city contains a Masonic Temple, an opera house, several churches, and public and parish schools. It was settled about 1794, and is governed by a mayor and council, elected for two years. The city owns and operates the waterworks. Pop.(1910) 13,152.

MIDDLETOWN: borough in Dauphin co., Pa.; on the Susquehanna river and on the Philadelphia and Reading and the Pennsylvania railroads; about 10 m. s.e. of Harrisburg. It is in a farming region and also has extensive manufacturing interests, the principal products being foundry and machine shop products, flour, dressed lumber, leather, stoves, furniture, tubing and iron cars, etc. There are also stone quarries in the vicinity. The trade consists chiefly of manufactured articles and farm and dairy products. There are several churches, public schools, banks, etc. The borough was founded in 1756, and was incorporated in 1828. The borough owns and operates the electric light plant. Pop. (1910) 5,374.

MID'DLEWICH: small market-town of Cheshire, England, on the Grand Trunk canal, 20 m. e. of Chester. Salt is extensively made; boat-building is carried on, and brick-works are in operation. Pop. over 3,300.

MIDDLING, a. *mĭd'lĭng* [from *middle* (see MID)]: of middle rank or degree; neither high nor low; of middle average quality; of moderate capacity; mediocre. MIDDLINGS, n. plu. *mĭd'lĭngs*, the coarser part of the flour left in the dressing-machine; see WHEAT.

MIDGARD, *mĭd'gärd*, in Scandinavian mythology, the dwelling place of the human race, formed out of the eyebrows of Ymir, one of the first giants, and joined to Asgard, the abode of the gods, by the rainbow-bridge.

MIDGE, n. *mĭj* [Ger. *mücke*, a small fly—from *mucken*, to hum: Dut. *mug*, a gnat: Bohem. *maucha;* L. *musca;* F. *mouche*, a fly]: common name of many species of small dipterous insects, of family *Tipulidæ*, much resembling gnats, but having a shorter proboscis. Their larvæ are aquatic; the perfect insects are often very annoying to human beings and to cattle. The little pink-colored tortuous worm known to anglers as the *Blood-worm*, frequent in water-barrels and in the mud near the edges of ponds and ditches, is the larva of a species of M. (*Chironomus plumosus*), a little larger than the common gnat, abundant in some marshy situations. The larva is much sought by birds and is a very tempting bait for fish. The pupa is cylindrical, with respiratory organs on the sides of the thorax. When the insect is ready to quit its pupa case, it rises to the surface of the water, and there remains suspended for a short time; the perfect insect, when it has issued from the case, also stands for a short time on the surface of the water. The genus is remarkable for the long hairs with which the antennæ of the male are furnished.—Another genus of Midges (*Simulia*) contains many species most tormenting to men and cattle, by entering the ears and nostrils, and alighting on the eyelids. They swarm on marshes and damp heaths in the warmer months. But none of them is nearly so mischievous as a species (*S. columbaschensis*) on the banks of the Danube, sometimes in such dense swarms that horses and cattle are suffocated by the numbers which enter the wind-pipe.—The common gnat is popularly termed Midge.

MIDGET, n. *mĭj′ĕt* [dim. of *midge*]: very diminutive creature: Canadian name for the sand-fly.

MIDHURST, *mĭd′ĕrst:* market-town of England, in Sussex, on the Rother, a navigable tributary of the Arun, 50 m. s.w. of London. Here are the ruins of an old castle of the De Bohuns, lords of M.; and within half a mile e. of the town stood Cowdry House, seat of the Montagues, which was burned 1793. At the grammar school, founded 1672, Richard Cobden was educated. Pop. (1861) 6,405; (1871) 6,753; (1881) 7,277.

MIDIANITES, *mĭd′ĭ-an-īts:* an Arab race, descended, according to Scripture, from Midian, son of Abraham by Keturah; thus distant kinsmen of the Israelites. They occupied the greater part of the country between the n. side of the Arabian Gulf and Arabia Felix, as far as the Plains of Moab. Others more civilized (if not, indeed, of Cushite origin) dwelt in the vicinity of the Sinaitic peninsula, and carried on a trade, particularly with Egypt. To the latter, we may presume, belonged Jethro, priest or 'sheik' of Midian—father-in-law of Moses. The main body of the M., in later times, were very troublesome neighbors to the Israelites till Gideon's great victory over them. They appear as a strong Bedouin confederation, given to invasion and ravage. Their national god was Baal-Peor.

MID-LO'THIAN. See EDINBURGHSHIRE.

MIDNAPUR, or MIDNAPOOR, *mĭd-na-pôr':* chief town of the district of Midnapur in India; on the n. bank of the Kasái river; about 65 m. s.w. of Calcutta. Its location is healthful and dry; it is well laid out, and supplied with abundant and good water. There is a large bazaar in Midnapur, in which are the public offices. An excellent training-school has been founded by the American missionaries there, which has been very successful among the natives, and has established village schools in the vicinity. The mission has also a printing-press, from which have been issued some of the earliest and most important works on the Santal language. The chief industries are the manufacture of copper and brass utensils, indigo, and silk. Pop. 33,150.

The *district* of Midnapur is in southwestern Bengal, forming part of the province of Orissa; 5,082 sq.m.; pop. 2,792,950; largest river, the Hooghly.

MIDRASH, *mĭd'răsh* [Heb. *darash*, to search, explain the Scriptures]: general name given to the free exposition of the Old Testament, with the historical legendary, exegetical, didactic, and homiletic comment thereon, which, for about 1,500 years after the Babylonian exile, formed the centre of all mental activity, both in and out of the schools, among the Jews. The work occurs as early as 2 Chron., xiii:22, although not, perhaps, in its later sense. The prohibitions and ordinances in the Mosaic records, to which a precise meaning was not, in all cases, attached, were, according to certain hermeneutical rules, specified and particularized, and further surrounded by traditional ordinances and inhibitions: Halacha (q.v.) = rule by which to go, or the binding, authoritative, civil, and religious law. The chief codes of this are the Mishna (q.v.), Gemara (q.v.), Sifra (amplification of Leviticus), Sifri (on Numbers and Deuteronomy), and Mechiltha (on a portion of Exodus). Another branch of the Midrash, however, is the Haggada (q.v.), a kind of free poetical homiletics on the whole body of the Old Testament (The Halacha being chiefly confined to the Pentateuch). Haggada was more noticeably ethical and consolatory. The chief collections of that part of the Midrash known as Haggada are Midrash Rabba, A.D. 700-1100 (on Pentateuch and Megilloth), and Pesikta (700), the extracts from which (Jalkut, Pesikta Rabbati, Sutarta, etc.) only are known, the original itself never having been printed. As a whole the Midrash is of great value, inasmuch as a search in its unattractive mass reveals numerous lexical and grammatical hints, and historical, topographical, and chronological notices; also remarkable suggestions in logic, metaphysic, theology, and in ethnography and natural sciences. The history of the Midrash embraces three periods: that of the Soferim (q.v.), the Tannaim (q.v.) and the Amoraim (q.v.), however obscure is the

real date of its origin. It is largely the homiletic literature of the early rabbis, wherein the simple exposition of Scripture is overshadowed by a free and varied interpretation, which illustrates as much the wit and fancy of its authors as the clear meaning of the text. Such homilies made Scripture familiar to masses of the people, as they gathered in the synagogues on Sabbaths and special days, developing not only a class of brilliant preachers, but a love of learning as well, which has been the heritage of Israel. See Dembitz, *Jewish Services in Synagogue and Home* (Phila. 1898); Zunz, *Gottesdien. Vorträge.*

MIDRIFF, n. *mĭd'rĭf* [AS. *hrif*, entrails: Dut. *middelrift*, the diaphragm: OH. *hreve*, the belly]: in *anat.*, the diaphragm; a muscular partition which separates the cavity of the chest from the belly.

MID'SHIPMAN: ninth and lowest grade of officers in the United States navy capable of regular promotion. They must be graduates of the Annapolis naval academy, where they are called 'cadet midshipmen,' until the warrant of midshipman is conferred on them, and they take rank in the navy in the order of merit. After 2 years of actual service at sea, a midshipman, if he can procure a favorable recommendation from his commander, is entitled to an examination for promotion before a board consisting of 3 captains and 2 commanders. Having passed this examination on the practical branches of seamanship, including naval tactics, practical navigation, gunnery, and the steam-engine, he becomes an ensign, and can be promoted to the higher grades of the service. In the British navy, the midshipman is more a naval apprentice under instruction than an actual officer. After 3½ years' service as midshipman, if he passes two qualifying examinations, and is not under 19 years of age, he becomes a sub-lieutenant, and is eligible for promotion to lieutenant and the higher grades.

MIDST, n. *mĭdst* [superl. of MID, which see]: the middle; the very centre: AD. in the middle. IN THE MIDST OF US (colloq.), among us, as neighbors, fellow-citizens, or fellow-countrymen. IN THE MIDST OF, among; involved in; in the thickest of. *Note.*—IN OUR MIDST, IN THEIR MIDST, instead of 'in the midst of us,' 'in the midst of them,' are improper.

MIDWIFE, n. *mĭd'wīf* [AS. *mid*, with, together with; *wif*, woman, wife]: woman who assists women in childbirth. MIDWIFERY, n. *mĭd'wīf-rĭ*, profession of a midwife; art of assisting women in childbirth; obstetrics.

MIDWIFERY: department of medical science which concerns itself with parturition and its allied subjects; also called *Obstetrics* [Lat. *obstetrix*, a woman who stands near, a midwife], and *Tocology* [Gr. *tokos*, childbirth]. For a male practitioner in this line of the medical art, the French name *accoucheur* is used. Midwifery,

as a branch of medical science, is understood to include the study of the anatomy of the parts of the female body concerned; conception and sterility, and the signs and duration of pregnancy; parturition in all its varieties; and the diseases peculiar to the puerperal state. Into the details of a subject so extended and complex, this article does not enter.

In a vast majority of cases the labor in parturition is what is called 'natural'—that is, the child presents itself in the normal position, and unaided nature completes the delivery within 24 hours (usually in less time) with safety to mother and child. Statistics show that about 99 in every 100 are 'natural' labor. 'Unnatural' labor arises either from malformation, disease, or weakness on the part of the mother, or from abnormal conditions of the child; and manual or instrumental aid becomes necessary to prevent the labor from being dangerously prolonged, or—in extreme cases—to render delivery at all possible. Of instrumental applications, by far the most important and frequent is that of the forceps (q.v.), intended not to injure either mother or child. The use of the forceps is necessary in about 1 case in 300; and of these forceps cases about 1 in 21 proves fatal to the mother, while 1 child in 4 is lost. In the operation of craniotomy, the head of the child is intentionally destroyed, with a view to save the life of the mother, the death of both being otherwise inevitable. This operation is not frequently resorted to; it proves fatal on the average to about 1 mother in $5\frac{1}{3}$. A more justifiable procedure in such cases is the Cesarian operation (q.v.).

History.—From all the passages in the Scriptures where midwifery is referred to, it is plain that women were the only practitioners of this art among the Hebrews and the Egyptians (see Gen. xxxv:17; xxxviii: 28; Ex. i:15-21), and it is equally certain that the Greeks and Romans confided this branch of medicine to women. Phanarete, the mother of Socrates, was a midwife; and Plato explains the functions and mentions the duties undertaken by these women. The Greek and Roman physicians were not ignorant of midwifery, for Hippocrates refers to the necessity of turning the child in certain cases, though his doctrines on this point, as also on the management of the placenta, are not in accord with modern practice; and Celsus, nearly four centuries later, treats of the mechanism of labor with great clearness. A gradual increase in the knowledge of this subject may be traced in the writings of Aëtius, and of Paulus Ægineta, who advocates a resort to craniotomy in certain cases. Rhazes seems to have been the first to advocate the rupture of the membranes, when, by their toughness, they impede labor; and Avicenna gave the first description of an instrument partially resembling the more modern forceps.

At the commencement of the 16th c., Eucharius Rhodion published a little book, which soon acquired celebrity. It was translated from the original High-German into Latin, French, and English, and is remarkable as the first book published on this subject in England. Its title is, *The Byrth of Mankynde, otherwise named the Woman's Book*, by Thomas Raynold, Physician (London 1540), and it contains no external evidence that it is a mere translation. In 1573 Ambrose Paré published a small work, in which he showed that foot-presentations were not dangerous, and that in malpresentations it was better to deliver by the feet than to attempt to bring down the head.

In the early part of the 17th c., the *sage-femme* (midwife) of Marie de Medicis published a collection of observations on midwifery. About this time (probably about 1640), Dr. Paul Chamberlen, English physician, invented the forceps with separate blades, such as is now used. The exact date of this important invention is not known, but 1647 Dr. Peter Chamberlen published a pamphlet entitled *A Voice in Rhama*, in which he speaks of his father's (Dr. Paul Chamberlen) discovery for the saving of infantile life. Hence the forceps must have been invented in the first half of the 17th c. The Chamberlen family (the father and three sons) did not, however, publish their discovery, considering that they had a right to use the secret in the way most to their own advantage; and the exact nature of their instruments was not known till 1815, when the tenant of a house near Maldon, in Essex, England, where Dr. Peter Chamberlen, one of the sons, had resided more than a century previously, accidentally discovered a concealed space, in which were, *inter alia*, a collection of obstetric instruments, including a double-bladed forceps and a vectis, which are now in the possession of the London Medico-Chirurgical Society. Therefore, though Chamberlen's celebrated *arcanum* was doubtless the double-bladed forceps, he seems to have been the inventor also of the vectis or lever. In 1668 Mauriceau's Treatise appeared, which ran through seven editions, and was for a long time the standard work on the subject. He gives a very full account of the process of labor; and his book having been translated into English, 1672, by Hugh Chamberlen, became widely known in Britain. This seems to have been the time when medical men in general began to engage in the practice of midwifery; Harvey, the Chamberlens, and others, taking it up in England; while La Vallière, mistress of Louis XIV., did much to establish the practice in France, by employing Julian Clement, a surgeon of high reputation, in her first confinement 1663.

The last point requiring notice in the history of midwifery in the 17th c. is the discovery of the use of ergot

of rye in accelerating parturition. In 1688 Camerarius stated that midwives in parts of Germany were in the habit of employing it for this purpose; but not till 1774 is further reference found to the use of this drug.

In the early part of the 18th c., different varieties of forceps, closely resembling Chamberlen's instrument, were invented by Giffard, Chapman, and others; Chapman being, as it is believed, the first public teacher of midwifery in London. About the middle of this century lived Sir Richard Manningham, who applied himself to this branch of the profession, and established a small hospital for the reception of parturient women, first of the kind in the British dominions. Midwifery was by this time fully recognized as a branch—though then and long subsequently considered as the lowest branch—of medicine. The names of Smellie, William Hunter, Denman, and Bland in England, and of Astruc and Baudelocque in France, are well known as promoters of various departments of the art of midwifery toward the close of the 18th c. In the 19th c., the art has steadily progressed. Not only are the members of the medical profession compelled to be as well versed in midwifery as in medicine or surgery, but the ignorant midwives of past times are now largely replaced by well-educated nurses, with diplomas, certifying that they have regularly attended lectures on midwifery, and have taken personal charge of a certain number of labors, under superintendence of a qualified teacher.

MIEN, n. *mēn* [F. *mine*, air, look—from It. *mina*, countenance—from mid. L. *minārĕ*, to lead: W. *min*, the lip or mouth: comp. Gael. *mèinn*, expression, the countenance]: the whole external appearance; aspect; air; manner.—Syn.: look; demeanor; countenance; deportment.

MIERIS, *mē'rĭs*, Frans van, the elder: 1635, Apr. 16—1681, Mar. 12; b. Leyden, Holland: Dutch painter. There is some question as to the correctness of the date given for his birth. He received his first instruction from Abr. Toorne Vliet, a famous Dutch designer; afterward studied under Gerard Dow, who called him the prince of his pupils. He applied himself chiefly to genre painting and occasional portraits. His pictures of domestic life are accurate in drawing and rich in color. In the treatment of stuffs and textures, he was superior to Dow himself; his representation of velvet and satin and other rich materials was wonderfully close; while the same accuracy of design, richness of coloring, and exquisite finish distinguish his portraits, the most famous and highly prized of which was his portrait of the wife of Cornelius Plaats. All his pictures are rare and command very high prices. Perhaps the most of them are in the gallery at Florence. He was a man of extravagant habits, and died a prisoner for debt at Leyden.

MIFFLIN, *mĭf'lĭn*, THOMAS: 1744–1800, Jan. 20; b. Philadelphia; of Quaker parentage. He was educated at the Univ. of Pennsylvania; 1765 went to Europe; and on his return entered into business partnership with his brother. In 1772 he began public life as representative from Philadelphia in the colonial assembly; and 1774 was delegate to the first continental congress. He was made maj. in one of the first Philadelphia regiments; and 1775, June, became col., and went to Cambridge with Washington, as his first aide-de-camp. He was rapidly promoted to quartermaster-gen., to adj.gen., and, 1776, May 16, to brig.gen. At the battle of Long Island he rendered distinguished service, covering the army's retreat, and afterward, by his stirring appeals to the people of Penn., raised considerable reinforcements for the continental army prior to the battles of Trenton and Princeton. In 1777 he was made maj.gen., but, becoming dissatisfied, became a prominent member of the famous 'Conway cabal' in opposition to Washington, after the failure of which he resigned his commission. In 1782 he was elected to congress, and 1783 was its pres.; 1785, he became a member and speaker of the Penn. state legislature; 1787, delegate to the national constitutional convention; 1788, succeeded Franklin as president of the supreme executive council of Penn.; 1791–1800 was gov. of the state. He died at Lancaster, Penn.

MIGHT, v. *mīt:* pt. of MAY, which see.

MIGHT, n. *mīt* [Goth. *mahts;* Ger. *macht;* Swiss, *mucht;* Bohem. *moc*, might, power (see MAY)]: strength, force, or power in general; ability. MIGHTY, a. *mīt'ĭ*, strong; powerful; very forcible; very great or eminent; momentous: AD. in very great degree; very. MIGHT'ILY, ad. *-ĭ-lĭ*, powerfully; efficaciously; vehemently; in a great degree. MIGHT'INESS, n. *-nĕs*, power; greatness; title of dignity. MIGHT AND MAIN, utmost effort; highest degree of strength.—SYN. of 'mighty': valiant; impetuous; violent; enormous; bulky; vast; forcible; efficacious; important.

MIGNARD, *mēn-yâr'*, PIERRE: 1610–1695; b. Troyes, France. He studied painting first under Simon Vouet; 1630 went to Italy, where in the 22 years of his residence there he became so famous that he was summoned to Paris to paint a portrait of the king. He refused to enter the Academy, and opposed Le Brun, its head, becoming chief of the opposition, which kept him from painting any of the great public works, though his decoration of the cupola of the Val de Grace, 1664, was famous. He applied himself chiefly to portrait-painting, becoming the chief portrait-painter of the century, and nearly all the celebrities of his time sat for him. Le Brun died 1690, and M. succeeded him. Many of his works have been engraved. While about to begin work on the cupola of the Invalides, at Paris, he died.

MIGNET, *mēn-yā′*, François Auguste Alexis: French historian: 1796, May 8—1884, Mar. 24; b. at Aix in Provence. He studied law in his native city together with Thiers, and went to Paris 1821, to enter on a literary life. He found employment in writing for the public journals, and having given lectures on modern history, which were received with great approbation, he was induced to write *Histoire de la Révolution Française* (2 vols. Par. 1824; 10th ed. 1840), in which that great event is regarded less in its moral than its philosophical aspects. It has therefore been reproached with leading to fatalism. His style is brilliant, but academic. After the revolution of 1830, he became a counselor of state, and keeper of the archives of the ministry of foreign affairs; but lost these offices 1848, after which time he lived in retirement. He edited *Négociations relatives à la Succession d'Espagne sous Louis XIV.* (4 vols. Par. 1836–42), to which he prefixed a masterly historic introduction. Among his later works are *Histoire de Marie Stuart* (2 vols. Par. 1851), and *Charles Quint, son Abdication, son Séjour et sa Mort au Monastère de Yuste* (1854); *Eloges Historiques* (1864); and *Rivalité de François I. et de Charles V.* For a *Histoire de la Réforme, de la Ligue et du Règne de Henri IV.*, he is said to have collected hundreds of vols. of manuscript correspondence.

MIGNONETTE, or Mignonnette, n. *mĭn′yŏn-nĕt′* [F. diminutive of *mignon*, darling; *literally*, 'little darling'], (*Reseda odorata*): plant of nat. order *Resedaceæ*, native probably of n. Africa (including Egypt) and of Syria; in universal cultivation for the delicious fragrance of its flowers. It is, according to circumstances and the mode of cultivation, an annual or a perennial, and even half-shrubby plant, with lanceolate entire or trifid leaves, and erect terminal racemes of small whitish flowers, which have the calyx 6-parted and as long as the corolla, the capsules 3-toothed. In the ordinary culture, M. is usually sown in spring, and takes care of itself. It is seen during summer in almost every garden, and during winter in almost every green-house; it is often cultivated in flower-pots in apartments, and perhaps no flower is more common in boxes placed outside of windows in towns. Yet it was introduced into England from Paris 1742 (according to a ms. note in the library of Sir Joseph Banks); and Lord Bateman brought it from the Royal Garden at Paris 1752, when it had not been long known in France. The same year it appears to have been sent from Leyden to Chelsea. It rapidly became a universal favorite throughout Europe, and later in the United States. What is called *Tree M.* is not even a distinct variety, but merely the common kind trained in erect form, and prevented from early flowering by pinching off the ends of the shoots. A handsome double-flowered variety also has been obtained.—Weld (q.v.) belongs to the same genus.

MIGRAINE, n. *mī'grān* [a corruption of *hemicrania*]: the brow-ague; a painful disorder generally on one side of the forehead: see MEGRIM.

MIGRATE, v. *mī'grāt* [L. *migrātus*, removed from one place to another: It. *migrare*]: to remove from one country to settle or reside in another. MI'GRANT, n. *-grănt*, one who or that which migrates, as a migratory bird or animal: ADJ. migrating, migratory. MI'GRATING, imp. MI'GRATORY-CELLS, n. term applied under certain circumstances to the colorless corpuscles of the blood. MI'GRATED, pp. MIGRATION, n. *mī-grā'shŭn* [F.—L.]: the act of removing from one country to another; the instinctive periodical change of abode from one climate to another, common to many species of animals, especially birds. MIGRATORY, a. *mī'grā-tėr-ĭ*, accustomed to migrate; passing from one climate to another; roving.

MIGRA'TIONS OF ANIMALS: movements of animals in a definite direction, in search of food or (in the case of fishes) of a fit place for spawning; apparently always guided by an instinct operating on all, or nearly all, the individuals of a species. These M. are not to be confounded with the mere diffusion of animals over a more or less extended area, nor with the distribution of species (see GEOGRAPHICAL DISTRIBUTION OF PLANTS AND ANIMALS).

Among mammals, such migrations are comparatively rare. The most remarkable instance is that of the Lemmings, which at no definite epochs, but generally once or twice in a quarter of a century, traverse Nordland and Finmark in vast hosts, ending their career in the Western Ocean, into which they enter, and come to a suicidal end; or, taking a direction through Swedish Lapland, are drowned in the Gulf of Bothnia. M. Martins, member of the great scientific Scandinavian expedition, seems to doubt the generally entertained view of these animals casting themselves into the Western Ocean, and believes that most of them perish from the cold in crossing the rivers, while many are killed by dogs, foxes, and a species of Horned Owl (*Strix brachyotos*), which, in large numbers, always accompanies these emigrations.

According to Gmelin, the Arctic Fox (*Vulpes lagopus*) always accompanies the lemmings in such numbers that, on this ground, it is entitled to be considered a migratory animal; but independently of these special migrations, it is stated by Sir James Ross that 'the young generally migrate to the southward late in the autumn, and collect in vast multitudes on the shores of Hudson's Bay; they return early the following spring to the northward, and seldom again leave the spot they select as a breeding-place.'

The Spring-bok (*Antidorcas Euchore*) is accustomed to make pilgrimages from one spot to another in the vast plains of s. Africa. Herds of many thousands are led

by their chiefs in these migrations, and the wonderful density of the moving mass may be imagined from the fact that a flock of sheep has been inextricably entangled and carried along without possibility of escape. Want of water is said to be the cause of these migrations, but Dr. Livingstone thought that there must be other causes.

The occasional incursions of wolves, in very severe winters, into districts in which they are not commonly found, and the long excursions of large groups of monkeys (*Entellus* and *Rhesus*), hardly fall within the scope of this subject.

Many of the cetacea are probably migratory. 'The migrations of the Porpoise (*Phocœna communis*) appear' —says Marcel de Serres in his prize-essay, *Des Causes des Migrations des divers Animaux*, p. 63—'to be as periodic as those of certain species of birds. During the winter, they constantly proceed from n. to s.; and when they feel the warmth of summer, they turn northward. Thus, they are common in summer in Greenland, while they are rare on our own (French) coasts, where they abound in winter.'

The number of species of birds that periodically migrate is so great that space fails here for a list of them. Marcel de Serres, in the work above quoted, gives a *Tableau de Epoque des Passages des Oiseaux*, which extends over nearly 100 pages: see BIRDS OF PASSAGE. Desire for suitable temperature and search for proper food are the apparent causes stimulating birds to these migrations; and in most instances, especially in the case of insectivorous birds, the food is intimately associated with the temperature.

The migrations of many species of fishes are as remarkable for their regular periodicity as those of birds. In some cases, fishes produced in fresh-water streams migrate to the ocean, and after spending some time in salt water, return (generally, with singular instinct, to their own birthplace) to fresh water to propagate their species. Some of these fishes—e.g., the Lamprey (*Petromyzon marinus*)—spend most of their lives at sea, and others—e.g., the salmon—in fresh water. The remarkable migrations formerly, but erroneously, supposed to be made by herrings, are noticed in the article on that fish. Many fishes of the same family as the herring, the *Clupeidæ*—as, for example, the sprat and pilchard—leave the deep sea for shallow water during the spawning period, when they approach the coasts in vast shoals. All such migrations as these seem due mainly to a reproductive impulse. See FISHES: LAND-CRAB.

Among insects, the Locust (*Locusta migratoria*) is most remarkable for migrations. These insects are probably produced much more abundantly some years than others, and as in such years their birthplace cannot afford them sufficient vegetation, they are led to migrate in search of food. Some idea of the occasional extent of their wanderings may be formed from the fact that, in

the early part of 1810, myriads of locusts appeared in Bengal, whence they proceeded westward, completely across the great Indian peninsula, to Guzerat and the neighboring provinces, whence they pursued their course southward toward Bombay, the whole period of their migration extending over between two and three years; while, in relation to their numbers, Capt. Beaufort calculated a swarm that appeared at Sardis, in Asia Minor, 1811, at more than 168,000,000,000,000.

MIGUEL, *me-ghĕl'*, Dom Maria Evarist (known usually as Don Miguel): pretender to the throne of Portugal: 1802, Oct. 26—1866, Nov. 14; b. Lisbon; third son of John VI. of Portugal, and uncle of Dom Pedro II., lately emperor of Brazil. He spent his early years in Brazil, unrestrained and uneducated. When he returned with the royal family to Portugal 1821, he could neither read nor write, and showed no talent for anything but fencing. He joined his mother, Charlotte Joachime of Spain, in her plots for the overthrow of the constitution and the establishment of a despotic govt.; part of the scheme being, that his weak father should be either formally deposed, or virtually deprived of power. The aged Marquis of Loulé, faithful servant of the king, having been removed by assassination, M., as Infant-generalissimo, caused the ministers to be arrested, 1824, Apr. 30, and his father to be closely watched in his palace; but the plot failed, and M. and his mother were banished. He led for some time a remarkably wild and profligate life in foreign countries. After the death of his father 1826, the queen's party set forth a claim to the throne on his behalf, as his elder brother, Dom Pedro I., was emperor of Brazil; and 1826, May 2. Pedro resigned the crown of Portugal in favor of his eldest daughter, Donna Maria da Gloria, proposing that her uncle M. should be her husband. and regent of the kingdom till her majority; to all of which M. agreed. But Queen Joachime's party had everything prepared for the restoration of absolutism. M. was declared king of Portugal. War ensued, and at first M. was victorious. He carried into full effect the principles of his party by a system of most severe repression of liberalism, and signalized himself by extreme tyranny of every kind, while his own life was one of wildest excess. In 1832 Dom Pedro took Oporto, and, his arms gradually prevailing, M. was obliged to sign a capitulation at Evora, 1834, May 26, by which he resigned all claim to the throne of Portugal, and agreed to retire altogether from the country. But scarcely had he been conveyed to Genoa, when he protested against this deed, and consequently all his estates in Portugal were confiscated, and an annual pension which had been secured to him was stopped. He went to Rome, where the papal govt. acknowledged him as rightful king of Portugal, but with no result. Latterly he lived at the castle of Bronnbach, in Baden, where he died.

MIHRAB, n. *mē′răb* [Arab. a praying place]: ornamental recess or alcove in the centre of the exterior wall of a mosque, having the mimbar or pulpit to the right. It always marks the direction of Mecca, and the people pray in front of it. In it a copy of the Koran is kept. A similar place is found in Jewish synagogues, pointing toward Jerusalem, and containing a copy of the Law.

MIKADO, n. *mī-kā′dō:* common title of the emperor of Japan. The term, said to mean honorable gate, or grand place, was formerly applied to the palace of the sovereign, but for a long period has been used to designate the official head of the nation. The M. claims to have descended from the divine beings who created the world. He has no family name, does not take that of any previous M., and the name by which he is known in history is selected after his death. He can have one wife and 12 concubines, and there are four imperial families from either of which a child may be selected for adoption by the M., and thus be brought into the line of succession. The first M. began to reign about B.C. 660; and 123 rulers, of whom 11 were females, have occupied the throne; and it is claimed that during the 2,500 years the line of descent has been unbroken. The present M., MUTSUHITO (q.v.), b. 1852, was crowned 1868. He at once abandoned the ancient policy of seclusion, received representatives of various Christian nations, and in 1869 removed his residence to Yedo, changing its name to Tokio. See JAPAN—*Government, History.*

MIKANIA, *mĭ-kā′nĭ-a:* genus of plants of nat. order *Compositæ*, nearly allied to *Eupatorium* (q.v.). The heads of flowers are 4-flowered, and have four involucral leaves. *M. officinalis* is a Brazilian species, with erect stem and heart-shaped leaves, abounding in a bitter principle and an aromatic oil, and valuable as a tonic and febrifuge. *M. Guaco* and *M. opifera*, also natives of warm parts of S. America, are among the plants which have high reputation—deserved or undeserved—for the cure of snake bites. They are twining herbaceous plants. *M. Guaco* is remarkable for large indigo-blue spots on the under side of its ovate leaves. The mode of using this plant, which is one of those called GUACO, or HUACO, by the Indians, is by dropping the juice of the fresh leaves into the wound made by a serpent; or little cakes are formed of the bruised plants, which are said to retain their power a long time. The subject requires investigation.

MIKLOSICH, *mĭk′lo-shĭch*, FRANZ: Slavist, most eminent for learning: b. 1813, Nov. 20, at Luttenberg; d. 1891. After studying law at the Univ. of Grätz, he went 1838 to Vienna to practice as advocate; but 1844 obtained a situation in the Imperial Library; 1850 was appointed professor of Slavic in Vienna. Among his principal works are: *Radices Linguæ Palæoslovenicæ* (Leip. 1845): *Lexicon Linguæ Palæoslovenicæ* (Vienna 1850); *Vergleichende Grammatik der Slaw. Sprachen*

(4 vols. 1852–74), a work which has done for Slavic what Grimm and Diez have done for the German and the Romance languages. Other works are *Die Bildung der Slaw. Personennamen* (1860), and *Die Zigeuner Europa's* (1872–78).

MIKLOS (St.) TOROK, *sĕnt mē-klŏsh' to-rŏk':* town of Hungary, county of Heves, near the Theiss, about 70 m. s.e. of Pesth, with which it is connected by railway. The people are employed chiefly in rearing horses and cattle, and in fishing. Pop. over 16,000.

MIKNAS, *mĭk'nas*, or Mequinez, *mĕk'e-nĕz*, or Meknaza: town in the province of Fez, in Morocco, 38 m. w. by s. from the town of Fez; in a fertile valley near the Sebu. It is surrounded by triple walls and a moat; is neat and well built, and contains the finest imperial palace in Morocco. This vast pile, erected by the Sultan Muley Ismail, is of marble, and the surrounding grounds are laid out in gardens, said to be the most beautiful in Morocco. M. is the summer residence of the sultan. There is an extensive trade in native produce. The chief manufactures are of painted earthenware and leather. Pop. unknown, as estimates vary from 15,000—55,000.

MILAN, *mĭl'an:* province of Italy, in w. part of Lombardy; bounded n. by Como, e. by Bergamo, s. by Cremona and Pavia, w. by Pavia and Novara; 1,155 sq. m. The surface is hilly in the n., with level plains in the s. The soil is fertile, though low and marshy along the Ticino river, which separates it from Piedmont on the n., and the Addio, Lambro, Olona, and other branches of the Po which drain the country. Railroads traverse it to Venice, Como, Parma, and Turin. Monza, on the Lambro river, 10 m. n.e. of Milan, is, besides Milan, the only considerable town, having about 20,000 inhabitants and a famous old cathedral. The portraits of all the Lombard sovereigns are preserved in this town. The surface of the province is kept very productive by being intersected with many canals for irrigating purposes; it affords fine pasturage for superior cattle, and produces fruit, corn, rice, silk, etc. The province has many flourishing villages, hamlets, farms, and country residences. It is divided into 5 districts now; under Austrian dominion it had 15, with an area of only 746 sq. m. The present districts are Abbiategrasso, Gallarate, Lodi, Milan, and Monza. Pop. (1891) 1,114,991; (1901) 1,442,179.

MIL'AN (Ital. *Milano*): second in size of Italian cities (after Naples and before Rome); cap. of the province of M.; 25 m. s. of the Alps at Como; 390 ft. above sea-level, on the river Olona, in the centre of the great plain of Lombardy. Pop. (1871) city 199,009; commune 261,985; (1881) city 214,004; with suburbs 295,543; (1901) commune 491,460. Being on the line of the chief routes of the central Alps, it derives great commercial advantages, while its fine canal-system opens for it communication with the principal rivers of Italy. The *Naviglio Grande*, or Grand Canal, connects M. with the Ticino, and

THE CATHEDRAL OF MILAN.

the Martesana canal with the Adda. The city, almost circular, is encompassed on three sides by walls and low ramparts; it has a circuit of about $7\frac{3}{4}$ m., and is entered by 10 gates. Notwithstanding its great antiquity, M. possesses but few remains of its early splendid structures, in consequence of the many calamitous wars by which it has been ravaged. Modern M. is one of the most opulent and populous cities of Italy; its best streets are regular, wide, and well paved, and kept with scrupulous care; the dwellings are commodious and tasteful, though of less imposing character than the great feudal Tuscan houses. M. abounds in churches worthy of note: of these, the principal is the famous Gothic cathedral, the *Duomo*, which, with the exception of St. Peter's in Rome, is the most magnificent ecclesiastical structure of Italy. It has a façade of white Carrara marble, and is adorned by 106 pinnacles and 4,500 statues, besides a variety of carvings of unsurpassable beauty. In form, it is a Latin cross, length 485 ft., breadth 252 ft. The height of the dome is 355 ft. Its foundation was laid 1386 by Gian Galeazzo Visconti, and during its erection many of the greatest European architects contributed designs for its embellishment. Within it, Napoleon was crowned king of Italy 1805. The Church of St. Ambrose (founded, 4th c., by Ambrose [q.v.] great Bp. of M.) is the most ancient in M., containing inscriptions, sarcophagi, and monuments full of antiquarian interest: it is the church in which the German emperors were crowned kings of Italy. The Dominican Church of *Santa Maria delle Grazie* contains in its refectory the famous *Cenacolo*, or *Last Supper*, by Leonardo da Vinci. The Church of San Carlo Borromeo (1847) is notable; and the Church of St. Nazaro possesses several masterpieces of the best schools of Italian art. There is also the Church of St. Sebastiano, anciently a Roman temple.

Among secular buildings, the most noteworthy is the magnificent Brera Palace, formerly a Jesuit college, now used for public schools of the fine arts, with the official name Palace of Arts and Sciences. Within its vast precincts, this unique institution includes an acad. of art, a choice gallery of paintings of the Bolognese and Lombard schools, a fine collection of casts for modelling, a splendid public library of 140,000 vols., and a rare collection of manuscripts, medals, and antiquities: attached to it are an observatory and a botanical garden. Besides the Ambrosian (q.v.), there are several large private libraries. Among scientific and artistic institutions of M. are the museum of natural history, the schools of surgery and medicine, especially that of veterinary practice, the celebrated Conservatory, or school of music, and a military geographical institute, well known for the excellence of the maps that it has issued. The educational establishments include four gymnasia, besides normal schools, technical schools, conventual schools, and a seminary. The charitable institutions are numerous and splendidly endowed, having an aggregate property of

more than $35,000,000; the *Ospedale Maggiore*, or Great Hospital, founded by the ducal house of Sforza 1456, accommodates 2,000 patients, and annually admits more than 20,000. The Trivulzi Hospital, endowed by the Trivulzio family, maintains and clothes 600 aged pensioners. The Milanese places of amusement are on as grand a scale as the other public buildings of the city; the first in point of celebrity being the theatre *La Scala*, which can accommodate 3,600 spectators. The *Corso*, or chief street of M., is the universal fashionable promenade; and the famous arcade, or *Galleria di Cristoforis*, with its brilliant shops and cafés, is also a favorite place of evening resort, and on account of its gay appearance has been called 'Little Paris.' M. has immense inland trade in silk, grain, rice, and cheese; and has considerable manufactures of silk goods, ribbons, cutlery, and porcelain.

M. (Lat. *Mediolanum*) was originally a town or village of the Insubrian Gauls. It was conquered by the Romans B.C. 222, received the Latin franchise about B.C. 89, and the full Roman franchise B.C. 49. Under the Romans it became a conspicuous centre of wealth and civic influence; its citizens were noted for refined manners and literary tastes, and the public buildings for beauty and elegance. In the beginning of the 4th c., it was selected as the residence of the imperial court by Maximian. M. was sacked by the Huns (under Attila) 452, by the Goths (under the brother of Vitiges) 539, and passed to the Longobards and Franks previous to its subjection by the German empire. After 961, it was long governed by dukes in the name of the emperors. The feuds of the Guelphs and Ghibellines distracted M., like all the other Italian cities. Supreme power became eventually vested in the Ghibelline Visconti, by whom the ascendency of M. was extended over the whole of Lombardy. 1535–1714 M. was a dependency of the Spanish crown; from the close of the war of the Spanish succession (1714) till the Napoleonic campaign of 1796, it was under Austria. Under Bonaparte, it was declared the cap. of the Cisalpine Republic, of the Italian Republic, and, finally, of the Kingdom of Italy. In 1815 M. was restored to Austria, and continued the cap. of the Austro-Italian kingdom until the Lombard campaign, with the battles of Solferino and Magenta, and the resulting annexation of Lombardy to Piedmont, 1859, by the peace of Villafranca, which made it a part of the kingdom of Italy: see ITALY.

In religion, the Milanese, by the force of circumstances, early developed a spirit of independence and a tendency to act and judge for themselves, which has led them at various periods to contest the extreme claims of the Roman see. The ritual of their bp. Ambrose is still in use; and it is reported that a strong party of the clergy in M. now incline to a reformed Catholicism, the use of the vernacular in the service, the marriage of priests, election of priests by the parishes, and similar reforms.

MILAN, *mē-lân′*, I., Obrenovitch, ex-King of Servia: b. 1854, Aug. 10, at Jassy. He was adopted by his cousin, Prince Michael, and was educated at Paris. On the assassination of Michael (1868), he became prince, but the govt. was in the hands of a regency until 1872, when the prince attained his majority and assumed control of state affairs. He married (1875) the princess of Stourdza, from whom he has been divorced. He became involved (1876) in war with Turkey, and 1878 secured the recognition of Servia as an independent state by the Treaty of Berlin. On the establishment of Servia as a kingdom (1882), he took the title Milan I. An attempt to assassinate him in October of that year failed. Troubles with the queen led to his abdication in favor of his son Alexander, 1889, March 6. He died 1901, Feb. 11.

MILAZZO, *mē-lât′sō* (anc. *Mylæ*): fortified sea-port on the n. coast of the island of Sicily, 18 m. w. of Messina. Its situation is unhealthful. The chief exports are tunny, wine, silk, fruits, corn, oil, and liqueurs. The town is irregularly built, and is considered almost impregnable, owing to the great natural strength of its position and the extent of its military works and citadel. Garibaldi, with 2,500 men, defeated 7,000 Neapolitans here 1860, July 20, and compelled the garrison to evacuate the fortress.—Pop. about 8,000.

MILBURN, *mĭl′bėrn*, William Henry (widely known as 'the blind preacher'): b. Philadelphia, 1823, Sep. 26. He became nearly blind in early life, but obtained an education at Illinois College. He entered the Meth. ministry 1843 as an itinerant preacher, and while serving in this capacity travelled 200,000 m. He was also located for a while at Montgomery and Mobile, Ala., where he was a successful pastor. He became noted as an eloquent preacher and lecturer; was chaplain of the house of representatives at Washington 1856, and three years later made a successful lecturing tour in England. On his return to this country, he was ordained in the Prot. Episc. Church, but became again a Methodist 1872. He was chaplain of the house of representatives 1885-93, then of the Senate till his death. His published works include *Rifle, Axe, and Saddle-bags; Ten Years of Preacher Life; Pioneers, Preachers and People of the Mississippi Valley*. He died 1903, April 10.

MILCH, a. *mĭlch* [Ger. *milch*, milk; *milken*, to milk: Icel. *milkr*, milk-giving: Gr. *amelgo*, I milk: Lith. *milzu*, to stroke, to milk a cow]: giving milk, as cows or goats; in *OE.*, soft; merciful; sweet. *Note.*—In connection with OE. meaning, a suggested derivation is Gael. *milis*, sweet; *milsead*, sweetness, softness.

MILD, a. *mīld* [Ger. *mild*, soft; Icel. *mildr*, lenient; *milda*, to soothe: AS. *mild*, merciful]: soft, smooth, or gentle; affecting the senses gently and agreeably; acting or operating gently; not stern, rough, or angry; not acrid; sweet and mellow; not sharp. Mild′ly, ad. *lĭ*, in a mild manner; tenderly; not severely. Mild′-

NESS, n. *-nĕs*, quality of being mild; softness; tenderness; gentleness of operation; pleasant condition.—SYN. of 'mild': meek; bland; good; tame; tranquil; calm; merciful; kind; placid; compassionate; clement; indulgent; tender; soothing; demulcent; softening; lenitive; mollifying; assuasive; moderate.

MILDEW, n. *mĭl′dū* [Ger. *mehlthau*, meal-dew; OHG. *militou*, rust on corn: comp. Gael. *mill-cheo*, mildew—from *mil*, to injure; *ceo*, a mist]: a disease which attacks plants; rust; blight; moldiness; spots of mold caused by moisture, on linen, paper, etc. M. is a term vaguely applied to certain diseased states of plants caused or characterized by the growth of small parasitical fungi; also to spots on cloth, paper, etc., and even on the surface of glass and other inorganic substances, produced by growth of minute fungi. The M. fungi are numerous, and the name M. is often given to many that are known also by other names, as BLIGHT: BRAND: BUNT: RUST: ETC. (see these titles; also BOTRYTIS: OIDIUM). Different species or families of plants have their own peculiar parasites; several kinds of parasitic fungus, however, are often known to infest one plant. Probably the name M. belonged originally to those molds which form white mealy patches on leaves. Some of these are of the genus *Erysiphe*, which exhibits fleshy, somewhat gelatinous masses, becoming globose *sporangia*, filled with spore-containing *asci*, and surrounded by a flocky *mycelium*, often spreading widely over the leaves and other parts of plants. Maples are sometimes covered with a M. of this kind, so as to be quite hoary. Similar mildews are often seen on pease and other leguminous plants; also on umbelliferous plants. Sulphur has been found a cure in some of these cases.—Many of the most destructive mildews are of red or brown color, as the M. of the pear, *Aecidium cancellatum*, that of the barberry, *Aecidium Berberidis*, etc.; while some are almost black, as the corn M., *Puccinia graminis*, by which the crops in some years are greatly injured. Whether M. is the consequence of unfavorable weather and of fungi attacking an already weakened plant, or is the consequence of infection by spores of fungi brought through the air or soil to a plant previously healthy, is not ascertained; probably sometimes the one may be the case, sometimes the other. There is no doubt that many kinds of M. appear chiefly toward the close of summer on leaves in which vegetable life has already mostly lost its power. MILDEW, v. to taint with mildew. MIL′DEWING, imp. MILDEWED, pp. *mĭl′dūd:* ADJ. affected with mildew. *Note.*—From the facts that *mildew* is generally found in the form of a dark or black smut, and that all kinds of it are produced by parasitic fungi, a connection is indicated with the Gael. *mial-dhu*, black aphides, or lice, upon plants—from *mial*, a tick or aphis, and *dhu*, black. Doubtless the similarity of the first syllable suggested a connection with L. *mel*, honey, and the transference to some kinds of *mildew* of a whitish appearance, of the popular term *honey-dew*.

MILE, n. *mīl* [F. *mille*, a mile—from L. *millĭă*, a thousand: L. *mille passŭŭm*, a thousand paces, a mile]: largest terrestrial measure of length in common use among the British and most of the European nations, and in the United States: in Britain and the United States it is 1,760 yards of 3 ft. each, = 5,280 ft. The term is derived from the Roman *milliare*, which contained 1,000 paces of 5 Roman ft. each, the pace being the average length of the step made by the human foot. The Roman foot being accounted as between 11·65 and 11·62 English inches, the Roman M. was thus less than the present English M. by from 142 to 144 yards; thus the Roman M. measured from 4,848–4,854 ft. English.—The length of the modern M. in different countries shows unaccountable diversity. Before the time of Elizabeth, scientific writers made use of a M. of 5,000 English ft., from the notion that this was the Roman M., forgetting the difference in value between the English and Roman foot. The present English M. is known as the 'English statute M.,' because it was incidentally defined by an act passed in the 35th year of the reign of Elizabeth to be '8 furlongs of 40 perches of $16\frac{1}{2}$ ft. each'—i.e., 1,760 yards of 3 ft. each; and it has since retained this value. The *geographical* or *nautical mile* is the 60th part of a degree of the equator (it is stated approximately at $69\frac{1}{16}$ English statute miles; but see Degree of Latitude), and is employed by the mariners of all nations; but in Germany the geographical M. denotes $\frac{1}{15}$ part of a degree of the equator, or 4 nautical miles. The following table gives the length, in English statute miles, of the various miles that have been or are commonly used:

	Eng. Miles.
English geographical mile,	= 1·153
German geographical mile,	= 4·611
Tuscan mile,	= 1·027
Ancient Scotch mile,	= 1·127
" Irish mile,	= 1·273
German short mile,	= 3·897
Prussian mile,	= 4·680
Danish mile,	= 4·684
Hungarian mile,	= 5·178
Swiss mile,	= 5·201
German long mile,	= 5·753
Hanoverian mile,	= 6·568
Swedish mile,	= 6·648
The French kilomètre,	= 0·621

and 29 kil. = 18 English statute miles nearly.

MILEAGE, n. *mīl'ăj:* fares paid for travelling by the mile in a conveyance. Milepost, or Milestone, post, stone, or other mark placed on a roadside to indicate the distance in miles of a traveller from a town or central place.

MILES, *mīlz*, Nelson Appleton: b. 1839, Aug. 8, Wachusettville, Mass. He studied at an acad. and afterward obtained a position as salesman in a Boston store. He entered the army 1861, Sep. 9, as lieut. 22d Mass. vols., and was wounded in the battles of Fair Oaks, Mal-

vern Hill, and Chancellorsville. In 1862 he became col. of the 61st N. Y. vols., and 1864, May 12, he was appointed brig.gen. vols., being with one exception the youngest man who had attained this rank in the army. He was prominent in the Richmond campaign 1864, and was brevetted maj.gen. In 1866 he was col. of the 40th U. S. infantry, but was transferred to the 5th infantry 1869. In 1867 he was brevetted brig.gen. and maj.gen. vols., and commissioned brig.gen. in the regular army 1880, Dec. 15. For brilliant services in subduing hostile Indians on the frontier, he has received the thanks of several state and territorial legislatures, honorable mention in a message to congress by Pres. Cleveland, and an elegant sword presented by the people of Arizona, 1887; promoted maj-gen. 1890; led the American expedition for the conquest of Porto Rico 1898; promoted lieut.-gen. 1900 and 1901; retired 1903, Aug. 8.

MILESIAN, n. *mĭ-lē′zhĭ-ăn:* a native or inhabitant of *Milētus*, an anc. city of Asia Minor. The term is applied also to natives of Ireland, descended, according to the legend, from *Milesĭŭs of Spain* (see FIRBOLGS).

MILETUS, *mī-lē′tŭs:* anciently, greatest and most flourishing city of Ionia, in Asia Minor. It was at the mouth of the Mæander, and was famous for woolen manufactures and extensive trade with the north. Before being forcibly colonized by the Ionians, it appears to have been inhabited by Carians. M. early founded a number of colonies on the Black Sea and in the Crimea, possessed a fleet, which sailed to every part of the Mediterranean, and even ventured into the Atlantic, and maintained long and expensive wars with the Lydian kings. Before the middle of B.C. 7th c., M. had founded more than 60 cities along the Hellespont, the Propontis, and Black Sea coast. The 'Milesians' were believed to be the purest representatives of the Ionians in Asia. After the conquest of Lydia by the elder Cyrus, it was subdued, with the whole of Ionia. It continued, however, to flourish till it was excited to rebellion against the Persians in the Ionian war, and was destroyed B.C. 494. It was rebuilt, but never regained its former importance. Its harbor gradually silted up, and the site of M. is now a marsh. M. has an honorable place in the history of Greek literature, being the birthplace of the philosophers Thales, Anaximander, and Anaximenes, and of the historians Cadmus and Hecatæus.

MILFOIL, n. *mĭl′foyl* [F. *mille*, a thousand: OF. *fuil* or *foil*, a leaf—from L. *millĕ*, a thousand; *folĭŭm*, a leaf]: the herb yarrow, found growing on roadsides, having small white flowers and numerous narrow pointed leaves; *Achillēă millĕfōlĭŭm*, ord. *Compositæ*.

MILFORD, *mĭl′ford:* town in New Haven co., Conn.; on Long Island sound; about 11 m. s.w. of New Haven; on the New York New Haven and Hartford r.r., with a station at the junction of this r.r. with Naugatuck r.r. It was settled 1639, Nov., and originally organized as a

kind of free ecclesiastical republic, the site having been purchased from the Indians. M. has good public schools, a newspaper, bank, several hotels, and several churches. Its chief manufactures are straw goods, boots and shoes, silverware, electrical and telephone supplies, and carriages. Pop. (1900) 3,783; (1910) 4,366.

MIL'FORD, town in Worcester co., Mass.; 18 m. s.e. of Worcester; on the Charles river and on the New York, New Haven and Hartford and the Boston and Albany railroads. It has a town-house, high school, public and parish schools, public library, banks, weekly newspaper, churches, and was formerly one of the largest boot and shoe manufacturing towns in New England. It still has large boot and shoe factories, machine-shops, tanneries, and manufactories of straw goods, silk and thread and bone cutters. Pop. (1890) 8,780; (1900) 11,376; (1910) 13,055.

MILFORD, town in Hillsboro co., N. H., on Souhegan river, and on the Boston & M. and the Fitchburg R.R.'s; about 27 m. south by west from Concord, and 15 m. s.w. of Manchester. The chief industries are connected with manufacturing, quarrying granite, lumbering and agriculture. The principal manufactures are flour, leather, lumber, piano keys, harnesses, furniture, quarry machinery, soap, paper boxes, wagons and carriages, and dairy products. Pop. (1900) 3,739; (1910), 3,939.

MIL'FORD: town in Pike co., Penn.; on the Delaware river, and the Erie railroad; 8 m. s.w. of Port Jervis, 97 m. n.w. of New York. It is in the most picturesque part of the Delaware valley, on a broad plateau 400 ft. above tide-water terminating in an abrupt bluff, with a semicircular range of mountains rising above the town on the n.w. and s. About 1 m. from M. are the Sawkill Falls and the Cliffs; 3 m. below are the Falls of the Raymondskill; and 13 m. below are the cataracts on the Big and Little Bushkill creeks. M. was laid out 1800; has been a popular place for summer rest for many years; contains several ante-revolutionary buildings; and has numerous hotels, private boarding-houses, churches, graded school, acad., etc. Pop. about 900. Summer pop. about 7,500.

MILFORD, *mil'ford:* parliamentary borough (contributory to Pembroke) and sea-port of S. Wales, county of Pembroke, on the n. shore of Milford Haven, 7 m. e.n.e. of St. Ann's Head. The haven is a land-locked estuary running inland 17 m. to Langwin (which is easily reached by vessels of 2,000 tons), and 1 to 2 m. in breadth. It is protected from winds by a girdle of undulating hills, is deep (15 to 19 fathoms in most parts, with spring-tides rising 25 ft.) and easy of access. The excellence of the haven has been recognized from the earliest times; but the rise of the town of M. may be said to have begun with the 19th c., when docks and quays, with a mail packet-station for Ireland, a dock-yard, ship-building slips, and an arsenal

were established here, only, however, to be removed in 1814. Since that time, with only occasional gleams of prosperity, M. has been in a declining condition; but the opening of the M. railway, and the construction of docks and wharves, have given a new impetus. New docks, capable of accommodating vessels of the largest tonnage, were completed 1882. The new available dock area is 60 acres, and commercial prosperity is now looked for. Pop. 5,100.

MILHAU, or MILLAU, *mē-yō′:* town of France, department of Aveyron, in a rich and fertile dale on the right bank of the Tarn, 55 m. n.w. of Montpelier. During the 16th and 17th c., it was one of the strongholds of the Calvinists. Leather and gloves are manufactured, and there is a good trade in wool, timber, hides, cheese, and wine. Pop. about 16,000.

MILIARY, a. *mĭl′ĭ-ă-rĭ* [F. *miliaire,* miliary—from L. *milĭārĭă,* a weed destructive to millet—from *milĭŭm,* a kind of small grain called millet]: in *med.,* miliary fever is an eruptive fever accompanied with innumerable white pimples resembling millet-seeds. MILIARY GLANDS, the sebaceous glands of the skin.

MILICZ, *mē′lĭch* (or MILITSCH) OF KREMSIER: religious reformer: about 1325—1374, June 29; b. near Olmütz, Moravia. He was in official service of the church 1350, and 1360 was canon of the cathedral at Prague, archdeacon, and connected with the court of the emperor. In 1363 he surrendered his offices, but continued preaching to the students in Latin and to the poor in their native tongue. His street preaching was wonderfully successful. In 1367 he made a fruitless visit to Rome to present to Urban V. his views concerning evils and abuses within the church. He returned to Prague, where he preached until he was summoned, to answer charges, to the papal court at Avignon, where he died before his case came to trial.

MILIOLA, n. *mĭl′ĭ-ō′lă* [L. *milĭŭm,* millet]: in *geol.,* a genus of minute foraminiferous shells—so called from their resemblance to millet-seed—occurring in myriads in certain strata. MILIOLITE, n. *mĭl′ĭ-ō-līt* [Gr. *lithos,* a stone]: a fossil shell of the genus *miliola.* MIL′IOLIT′IC, a. *-lĭt′ĭk,* or MIL′IOLITE, a. *-līt,* of or pertaining to or containing miliolites. MILIOLITE LIMESTONE, a building stone, one of the group of the Paris basin, almost entirely made up of these microscopic shells.

MILITANCY, n. *mĭl′ĭ-tăn-sĭ* [see MILITANT]: in *sociology,* social condition of a nation or tribe ideally organized for war. In such a state of society the tendency is for the body of warriors to bear the largest practicable ratio to the body of workers; individuality becomes merged in the community; despotism and centralization ensue, and a process of regimentation goes on even in civil life; freedom of movement from place to

place is restricted; state organizations take the place of private combinations; and such a society usually evolves, or endeavors to evolve, a self-sufficient sustaining organization, drawing, as much as possible, all supplies from its own resources.

MILITANT, a. *mĭl'ĭ-tănt* [L. *milĭtans* or *milĭtan'tem*, serving as a soldier; *milĭtātus*, served as a soldier—from L. *mīlĕs;* It. *milite*, a soldier]: serving as a soldier; fighting; engaged in warfare. THE CHURCH MILITANT, the Christian Church on earth, as engaged in constant warfare against her enemies—*church triumphant*, the Christian Church in heaven. MILITARY, a. *mĭl'ĭ-tĕr-ĭ* [F. *militaire*—from L. *milĭtāris*, of or belonging to a soldier]: pertaining to soldiery or to arms; engaged as a soldier; derived from services or exploits of a soldier; warlike; martial: N. the soldiery; the army. MILITARISM, n. *mĭl'ĭ-tĕr-ĭzm*, that state or condition of a country in which government by force or the sword is predominant, in contradistinction to a popular and constitutional government. MILITATE, v. *mĭl'ĭ-tāt*, to operate unfavorably; to act in opposition, followed by *against*. MIL'ITATING, imp. MIL'ITATED, pp. MILITIA, n. *mĭ-lĭsh'ă* [L. *milĭtĭă*, warfare]: citizens embodied and trained as soldiers, liable to serve for the internal defense of a country; a body of men trained and disciplined in military tactics, but not regular soldiers (see MILITIA, below). MILI'TIAMAN n. *-ă-măn*, one who serves in the militia; one not a regular soldier.

MILITARY ACADEMY, ROYAL: establishment at Woolwich, England, through which must pass all candidates for the Royal Artillery and Royal Engineers. The age for entrance is 17 years, and the vacancies are open to public competition. The pupils are denominated military cadets, and the parents or guardians have to make a considerable payment in regard to each, so long as they remain at the academy; the annual charge for the son of a civilian being £120, that for the son of a naval or military officer less, according to rank of the father. When the term of instruction—which comprises a thorough general education, with the higher mathematics, fortification, gunnery, and military duty—is completed, the cadets compete for the vacancies in the engineers and artillery, those who pass the best examination being allowed to select the former corps. Those who obtain commissions in the engineers proceed to Chatham for further instruction (with military pay, however) in their professional functions. The artillery cadets at once join the Royal Artillery as lieutenants.

MILITARY ACADEMY, UNITED STATES. See UNITED STATES MILITARY ACADEMY.

MILITARY LAW: a term which applies to and includes such rules of action and conduct as are imposed by a state upon persons in its military service, with a

view to the establishment and maintenance of military discipline. It is largely, but not exclusively, statutory in character, and prescribes the rights of, and imposes duties and obligations upon, the several classes of persons composing its military establishment; it creates military tribunals, endows them with appropriate jurisdiction and regulates their procedure; it also defines military offenses and by the imposition of adequate penalties, endeavors to prevent their occurrence.

Distinction Between Military and Martial Law.—It is proper to observe, at this point, that the terms *military law* and *martial law,* though frequently confused, are by no means synonymous. Military law is in great part statutory in character and regulates the conduct of military persons at all times and in all places, without as well as within the territorial jurisdiction of the United States; that is, military law is applicable to certain persons, not only in time of peace, but in time of war as well, and its operation is not restricted to the territory of the United States, but follows its forces wherever they may go in the performance of lawful military duty or in the prosecution of a legitimate and duly authorized military undertaking. The Naval Articles of War, for example, do not cease to be binding upon the officers and men who constitute the crew of a vessel of war, when they pass from the territory of the United States into the high seas; indeed, by the comity of nations, those laws continue to be operative while such vessel is in the territorial waters of a foreign state. So, too, the Articles of War continue in force and have extra-territorial operation when any portion of the constitutional military forces enters foreign territory in the prosecution of a war lawfully declared by the congress. The military laws of the United States had the same binding force in the armies of Generals Scott and Taylor while operating in Mexico that they had in respect to those portions of the army which remained within its territorial jurisdiction during that period. Military law has, also, chiefly to do with the acts and relations of military persons; it applies to the conduct of citizens in an exceedingly limited number of cases, in each of which there must be the express authority of an enactment of congress.

Martial law, on the other hand, is not statutory in character, and arises, in every case, out of strict military necessity. Its proclamation, or establishment, is not expressly authorized by any of the provisions of the constitution; it comes into being, as will hereafter be seen, only in the territory of an enemy in time of war, or in a part of the territory of the United States in which the proper civil authority is, for some controlling reason, unable for the time to exercise its proper functions. In the former case it is known as *military rule* or the *law of military occupation* and, as such forms a part

of the law of nations. It disappears when such forcible resistance to the operation of the law has been overcome, or has ceased to exist, and the civil authorities have been enabled to resume the exercise of their appropriate functions.

Other Sources of Military Law.—While military law is in great part statutory, it is the function of the higher civil courts to interpret the statutes enacted by the congress, and to apply them to cases arising in connection with their execution: and the decisions of such courts are of equal authority with the statutes upon which they are based. Among other forms of written military law may also be mentioned the decisions of the president and secretary of war in military matters; the opinions of the attorney-general and of the judge-advocate general: the general regulations of the army and the general orders of the war department. There is also a body of well established usages known among military men as 'customs of war,' which correspond, in binding force, to customs at common law.

Courts-martial.—Military law is enforced by means of certain tribunals, created for the purpose, called courts-martial. These tribunals are created by the order of a proper convening authority, and are empowered by statute, to determine challenges, to try accusations against military persons, to reach findings of guilt or innocence respecting the same, and to impose appropriate sentences. Their sentences, however, have no legal validity, being in the nature of recommendations merely, until they have received the approval of a military commander, designated by law for this purpose, called the *reviewing authority.* With such approval or confirmation, however, their sentences become operative and acquire the same sanction as the sentences of civil courts having criminal jurisdiction, and are entitled to the same legal consideration. Courts-martial are classified, in accordance with their jurisdiction, into *General* and *Inferior Courts-martial;* the latter term including the regimental and garrison court-martial, and the summary court. The general court-martial is the highest tribunal known to military law, and has the most comprehensive jurisdiction in respect to both persons and cases. It may try any person subject to military law for any offense over which such tribunals are given statutory jurisdiction. The jurisdiction of the minor courts is restricted as to the persons and cases triable by them, and as to the punishments which they may impose upon conviction.

When the cases referred to courts-martial for trial have been completed, or, in certain contingencies, at the discretion of the appointing power, they are dissolved by the authority that created them and simply cease to exist as military tribunals.

The General Court-martial.—This court has the most extensive jurisdiction, both in respect to persons and

cases, of any of the tribunals authorized by the articles of war. It may try any military offender, whatever his rank, for any act made an offense by military law. This court may be convened at any time by the president, or by the secretary of war acting in his behalf, by a general commanding a territorial division of an army in the field, or by a general or colonel commanding a separate territorial department. If the convening officer be the accuser or prosecutor, however, the court is convened by the president. In time of war two classes of persons are given authority to convene general courts-martial—commanders of divisions and commanders of separate brigades. This provision applies to the tactical organization of armies in the field, as distinguished from the geographical organization of military divisions and departments into which the territory of the United States and its insular possessions is habitually divided in time of peace.

Composition.—The statutes authorizing the several military tribunals known as courts-martial—contain the requirement that they shall be composed of *commissioned officers*—a term applied to persons in the military service, of and above the rank of additional second lieutenant, who have been appointed by the president, with the advice and consent of the senate, and whose appointments are evidenced by commissions under seal, signed by the president and countersigned by the secretary of war. The law requires that 'general courts-martial may consist of any number of officers, from five to thirteen inclusive; but they shall not consist of less than thirteen when that number can be convened without manifest injury to the service.' Such judicial powers, therefore, as are vested by statute in a general court-martial become operative and may be fully exercised by a properly constituted tribunal composed of at least five members. A less number is without power to enter upon the trial of a case, to proceed with a trial already begun, or to perform any act of a judicial nature. The number of officers who shall compose a particular court is determined, in conformity to the terms of the statute, by the proper convening authority, and his conclusion in that regard is final.

The Judge-Advocate.—All courts-martial having general, as distinguished from summary jurisdiction, are provided with officers, detailed for the purpose by the proper convening authority, whose duty it is to prosecute cases coming before them in the name of the United States. The appointment of these officers is vested by statute in certain convening officers, who, as a consequence of their power to appoint courts-martial, are authorized to appoint judge-advocates for the same. The office of judge-advocate is a temporary employment created by statute; the general duties of the office are defined in the Articles of War, which empower the judge-

advocate to prosecute in the name of the United States. Other statutes and regulations confer upon him the power to summon witnesses and in certain cases to compel their attendance by the issue of compulsory process. The law, regulations, and the custom of service thus vest in the judge-advocate the duty of preparing the case for trial and charge him with the responsibility of conducting the prosecution. In addition to his duty as prosecuting officer in behalf of the United States, the Articles of War provide that the judge-advocate 'shall so far consider himself counsel for the prisoner as to object to any leading question to any of the witnesses, and to any question to the prisoner the answer to which might tend to criminate himself.' The duty of the judge-advocate toward the accused should not be regarded as confined to the limited province of 'counsel for the prisoner' as the same is defined in the Articles of War. Where the accused is ignorant and inexperienced and without counsel —especially where he is an enlisted man—the judge-advocate should take care that he does not suffer upon the trial from any ignorance or misconception of his legal rights, and has full opportunity to interpose such plea and make such defense as may best bring out the facts, the merits, or the extenuating circumstances of his case.

Counsel.—An officer or soldier put upon trial before a court-martial is not entitled, as of right, to have counsel present with him to assist him in his defense, but the privilege is one which is almost invariably conceded if counsel be secured within a reasonable time; and where it is unreasonably refused, such refusal may constitute ground for the disapproval of the proceedings.

The Inferior Courts-martial.—The Regimental Court-martial.—The Articles of War provide that 'every officer commanding a regiment or corps shall be competent to appoint, for his own regiment or corps, courts-martial, consisting of three officers, to try offenses not capital.' In addition to the commanders of regiments, properly so-called, the chiefs of such of the staff corps as include enlisted men in their personnel may convene these courts at posts or places occupied by troops under their direct military control and command. The strictly criminal jurisdiction of this tribunal having been transferred to the summary court by a recent enactment of the congress, its functions are now largely restricted to cases which involve the redress of grievances alleged by enlisted men to have arisen in the administration of the commands to which they belong. It can now be lawfully convened for the trial of a soldier only in a case, properly referable to a summary court, in which the party defendant, being a non-commissioned officer, formally requests that the charges against him be passed upon by a regimental court-martial, or when such trial has been authorized by the officer competent to order the trial of the accused by a general court-martial.

The Garrison Court-martial.—While the garrison court-martial has the same jurisdiction in respect to offenses as the other inferior courts recognized by the Articles of War, its jurisdiction as to persons is considerably more extensive, and it may try enlisted men of any corps or arm of the service who are attached to, or form a part of, the command of the officer who has power to convene it. The regimental and garrison courts are each composed of three officers and, like the general court, are provided with judge-advocates. The procedure is the same as that of the general court, save that the testimony is not recorded.

The Summary Court.—This court is composed of a single officer and may be convened 'by the commanding officer of each garrison, fort or other place, regiment or corps, detached battalion, or company, or other detachment of the army.' The court may be appointed, however, and the officer who is to compose it may be designated by superior authority—that is, by the brigade, division, department, or post commander—when such a course is by him deemed either proper or desirable. The terms of the statute in respect to its constitution are thus seen to be extremely general and authorize the court to be convened by the commanding officer of a fort, camp, or other place, the garrison of which is composed of troops of the same or different corps; or by the commander of a regiment, battalion, separate company, or detachment in the field, without restriction as to its composition, for the trial of enlisted men charged with offenses falling within the jurisdiction of an inferior court in respect to the punishment which may be awarded upon conviction. When but one officer is present with a command the law requires that he shall constitute the court, and shall hear and finally determine such cases as are properly referable to it for trial.

As its name implies, the procedure of this court is summary in character. Cases are brought to trial within twenty-four hours after the arrest of the accused, or as soon thereafter as practicable, and the court sits at hours fixed by the post commander in appropriate orders or, in the absence of such orders, at the convenience of the court. The officer constituting the court is not sworn, but performs his duty under the sanction of his oath of office. The accused appears before the court and, as the right of challenge does not exist, is arraigned in the usual manner. The commanding officers who are authorized by law to approve the sentences of summary courts have power to remit or mitigate the same. When the commanding officer sits as a summary court, no formal approval of the sentence is required by law; but he should sign the sentence in such case in his official capacity as commanding officer, and date his signature.

Jurisdiction of Military Tribunals.—Courts-martial have power to try military persons only for military

offenses, save in time of war, when certain persons who accompany the armies in the field are similarly triable. The punishments which a general court-martial may impose include the capital penalty and are specified in the Articles of War; the power of the inferior courts to punish is restricted to three months' imprisonment, with or without forfeiture of pay, including reduction to the ranks in the case of a non-commissioned officer. The procedure of courts-martial is substantially the same as that of civil courts having criminal jursidiction. The accused may challenge any members for cause stated, but peremptory challenges are not allowed. The court and judge-advocate are sworn and testimony is received under the usual witnesses' oath. The allegations against the accused are embodied in 'charges and specifications' which correspond closely to the indictment and counts at criminal law; upon these the accused is arraigned and may plead to the jurisdiction, in bar of trial or in abatement of the action, and the court may decide any issues so arising; when these pleas have been exhausted, or if none of them be resorted to, a plea to the general issue is made, upon which the case goes to trial on its merits. The rules of evidence are those which regulate the admission of testimony in criminal cases in the courts of the United States. The judge-advocate prosecutes in behalf of the United States and, when the prosecution has rested, the witnesses for the defense are heard and the case is submitted on arguments in which the judge-advocate has the right to begin and close. The court is then closed for deliberation and a finding is reached, as to each separate charge and specification, by a majority vote. An appropriate sentence is then imposed, the majority rule prevailing, except in the case of a capital sentence, where a vote of two-thirds is necessary. The record is then forwarded to the officer who convened the court, whose province and duty it is to take action upon —approve or disapprove, etc.—the proceedings after the same are terminated and the record has been transmitted to him for such action. This officer is ordinarily the commander who has convened the court. In his absence, however, or where the command has been otherwise changed, his successor in command, or 'the officer commanding for the time being,' is invested with the same authority to pass upon the proceedings and order the execution of the sentence in a case of conviction.

In cases, however, of sentences of death or dismissal, imposed in time of peace, and of some death-sentences adjudged in time of war, together with all sentences 'respecting general officers,' while the convening officer (or his successor) is the *original* reviewing authority, with the same power to approve or disapprove as in other cases, yet, inasmuch as the law prescribes that the sentence shall not be executed without the confirmation of the president, the latter becomes in these cases the *final*

reviewing officer, and the sentence, having been approved by the officer who convened the court, the record is transmitted to him for his action. If, however, the proceedings or sentences are disapproved by the original reviewing officer, the record is not transmitted to the president, as there is nothing left in such case for the action of higher authority. Where a general court-martial is convened directly by the president as commander-in-chief, he is of course both the original and final reviewing authority. The authority of a military commander as reviewing officer is limited to taking action upon the proceedings and sentence by approving or disapproving the same, wholly or in part, and directing the execution of the sentence, and to the incidental function, of pardoning or mitigating the punishments which have been approved by him. Action not included within these powers he is not authorized to take. The power to remit or mitigate sentences awarded by military tribunals is conferred, in express terms by statute, which provides that 'every officer who is authorized to order a general court-martial shall have power to pardon or mitigate any punishment adjudged by it except the punishment of death or of dismissal of an officer. Every officer commanding a regiment or garrison in which a regimental garrison or summary court-martial may be held shall have power to pardon or mitigate any punishment which such court may adjudge.'

MILITARY OPERATIONS. See STRATEGY; TACTICS, MILITARY.

MILITARY ORDERS: religious associations which arose from a mixture of the religious enthusiasm and the chivalrous love of arms which almost equally characterized mediæval society. The origin of such associations may be traced to the necessities of the Christian residents of the Holy Land, in which the monks, whose first duty had been to serve the pilgrims in the hospital at Jerusalem, were compelled, for self-defense, to assume the character of soldiers as well as of monks (see ST. JOHN, KNIGHTS OF). The order of the Templars (q.v.) was of similar origin. Those of Alcantara and Calatrava in Spain had for immediate object the defense of their country against the Moors. These orders, as well as that of Avis in Portugal, instituted with a similar view, followed the Cistercian rule, and all three differed from the Templars and the Knights of St. John in being permitted by their institute to marry once. The same privilege was enjoyed in the Savoyard order of Knights of St. Maurice and the Flemish order of St. Hubert. On the contrary, the Teutonic Knights, who had their origin in the Crusades (see GRAND MASTER), were bound by an absolute vow of chastity. With the varying conditions of society, these religious associations have at various times been abolished or fallen into disuse; but most of them still subsist in the form of orders of knighthood; and in some

of them, attempts have recently been made to revive, with certain modifications, their original monastic character.

MILITARY SCHOOLS: institutions of instruction of various kinds, for persons connected with the army.—In the *British* army, they are divisible into several classes: 1. Those for the education of officers already in the service; of these, are the Staff College (q.v.), the School of Military Engineering, and Garrison Schools of Instruction. 2. Professional schools common to officers and men; for these, see ARTILLERY—*Schools:* MUSKETRY, SCHOOLS OF. 3. Schools for professional education of candidates for commissions; for these, see MILITARY ACADEMY, ROYAL; SANDHURST MILITARY COLLEGE. 4. Schools for men in the ranks and for their children; for these, see SCHOOLS, REGIMENTAL: for the instruction provided for their sons or orphans, see MILITARY ASYLUM, ROYAL.

In *France*, where a military commission is one of the best scholastic prizes looked forward to, no attempt is made to impart general education at the military seminaries; a boy is required to have a thorough general knowledge before he can be admitted to these institutions. Open to universal competition, and being the only channel—or nearly so—to the best employment under the state, the great military schools, by the high standard required for them, give great impetus to general education; and the Lycées, or public schools, adapt their course of instruction to the anticipated competition. In the army two-thirds of the line commissions (after a service of two years in the ranks, or after one year's service, and passing the final examination at the Infantry School at St. Maixent), and one-third of those for the scientific corps, are given to non-commissioned officers, but few of these rise beyond the rank of captain; the remaining commissions in the line and scientific corps, and all appointments to the staff, are given by competition, after a careful course of professional education. The candidates in open competition (in civil subjects only) are placed according to merit either in the Infantry School of St. Cyr, or the celebrated Polytechnique; at both colleges they have the right, if they need it, to partial or entire state support. From the School of St. Cyr, the more promising pupils pass to the Staff School, and thence, after a thorough course, to the Etat Majeur of the army; the remaining students pass as subalterns into the line. The pupils of the Polytechnique, which is entered after the age of 17 years, have annually about 160 valuable prizes open to them. The first 30 to 40 candidates usually select civil employment under the state, such as the 'Ponts et Chaussées;' those next in merit choose the artillery and engineers, and pass through a technical course at the School of Application. The remaining students either fail to qualify, and leave the school, or have to content themselves with commissions in the line, subordinate situations in

the government, civil or colonial service, or they retire into civil life altogether. In actual service, there are schools for the men, who are taught also trades and singing. The standard of education among French is far higher than among English soldiers, as the conscription draws the men from all classes of society.

In *Germany*, the system of military education differs from that of France in that competition is sparingly resorted to; and the object is to give a good general and professional education to all the officers, rather than a specially excellent training to a selected few. Aspirants for commissions must enter in the ranks as gentleman-volunteers (*avantageurs*), and within six months pass a good examination in general and liberal knowledge (about equivalent to that passed in England for entrance into Sandhurst); if, however, the candidate has been educated in a cadet-house—semi-military schools for youths—and has passed properly out of it, he joins the army in a rank equivalent to midshipman in the navy (*porte-epée fähnrich*). After some further service, the aspirant goes for nine months to one of three 'Division Schools,' where he completes his professional education. If he pass the standard here required, he is eligible for the next vacancy, but cannot be commissioned, unless the officers of the corps are willing to accept him as a comrade. The Artillery and Engineer schools do for those services what the Division Schools do for the line. The culmination of German military education is the Staff School, open to competition for all the officers of the army, and presenting the highest prizes in the profession. In all the schools, the candidates study at the expense of the state, or receive great auxiliary grants.

In *Austria*, the preliminary step to a commission is obtaining the rank of a cadet, either from a Cadet School (which boys have to enter at an early age), or by passing the same examination as cadets from these schools have to pass. If recommended, they become officers after a year's service and showing a proper knowledge of their work. Cadets from the schools have the advantage of being commissioned at once if qualified. The young officer's chance of entering the Staff School—and therefore the staff—depends on his place at the final examination at a line or scientific corps academy. There are schools for training for non-commissioned officers and for officers; and senior departments for imparting more extended instruction to both classes. Candidates for appointment as non-commissioned officers pass by competition through the lower houses, where they remain till 11 years old; the upper houses, which detain them till 15; and the school companies, whence, after actual apprenticeship to service, a few pupils pass to the academies for aspirants for commissions, and the others are drafted into the service as non-commissioned officers.

In *Italy*, the system nearly approaches that of France.

The educational status of the Italian officers is considered high.

For governmental military education in the United States, see UNITED STATES MILITARY ACADEMY.

MILITARY SECRETARY: officer on the personal staff of generals in high command. His duties are to conduct the correspondence of his chief, and to transact a great amount of confidential business, which would quite unduly occupy the time of the general himself.

MILITARY TRAIN: formerly a highly important corps of the British army, having the function of transporting the provisions, ammunition, and all other material, together with the wounded in time of battle. It was formed after the Crimean war, on the dissolution of the Land-Transport Corps, and comprised six battalions, in all 1,840 officers and men, and 996 horses, with proportionate wagons and ambulances. It constituted only the nucleus of a transport service for a large army. It was disbanded 1870, as being too military in its formation; and its functions are now performed by the transport staff of the commissariat department, assisted in time of war by a regimental transport train.

MILITELLO, *mē-lē-tĕl'lō:* city of Sicily, province of Catania, 21 m. s.w. of the town of Catania; on a mountain, in a somewhat unhealthful situation. In its vicinity are important salt lagoons. Pop. 10,000.

MILI'TIA: term which has now acquired the meaning of the domestic force for the defense of a nation, as distinguished from the regular army, which can be employed at home or abroad in either aggressive or defensive operations. Every nation has a reserve, under its law military, upon which its defense would fall, on the serious discomfiture of the regular army, or of a portion of it; but the system differs in each country.

In Great Britain, the militia is a constitutional force raised under sanction of parliament, in which the people —in theory, at least—wage their own bodies for the defense of their own soil, and in which they depute the sole leadership and command to the sovereign and the crown nominees. Organized by counties and cities, it is essentially a local force; but the right of granting commissions, formerly held by the lords-lieutenants, was transferred to the crown by the act of 1871. Under the Anglo-Saxons, all men were required to bear arms, as a sort of body-rent for the land that they held; but no special organization being adopted, efficiency was rarely attained in the use of arms. This the nation found, to its cost, when the Danes overran it during Alfred's reign. That great king, to prevent a similar occurrence, established the militia or *fyrd*, making land the basis of numbers, but the family system the basis of discipline: so many families were a tithing, ten tithings a hundred, and hundreds were united into county powers, each under its

heretoch, dux, or duke. Each section of the community had not only to furnish its quota in time of war, but also to provide arms, keep them in repair, and undergo so many days' training every year. This arrangement subsisted in more or less vigor until the Conquest; then the feudal troops at first rendered the militia unnecessary; but it never wholly ceased to exist. When the crown began to contend with the Norman barons, it naturally found its most powerful instrument in reviving the Saxon militia; and the English yeomanry became henceforth the fear of England's enemies, and a guarantee for the gradual enfranchisement of the people. Henry II. established 'an assize of arms,' at which every holder of land was bound to produce one or more men fully equipped, and capable of fighting in the national defense. This annual assembly of the fyrd or militia is recorded after the Conquest first in 1181. Further alterations to suit advances in the art of war took place 1558. In 1604, James I. abolished the fyrd, and substituted 'Trained (commonly called Train) Bands,' to the number of 160,000 men—a force partaking of the nature of militia and volunteers, but deficient in discipline and drill. During the civil war of Charles I., the train bands or militia mostly sided readily with the parliament. Up to this time, the command had never by any law been definitely assigned to the crown or to any other authority. After the Restoration, the loyal parliament of Charles II. immediately reorganized the militia—essentially on its present footing—and declared as law that 'the sole supreme government, command, and disposition of the militia is, and by the laws of England ever was, the undoubted right of his majesty and his royal predecessors.' As, however, the crown from this time began to depend for its support upon a mercenary army, the militia was neglected until 1757, when a large portion of the regular army being absent in the Seven Years' war, it was carefully organized for defense of the kingdom. Several militia acts have been subsequently passed. In 1871, the control of the militia was transferred from the lords-lieutenants to the war office. Various laws on army organization, completed 1876, had for a prominent aim the consolidation of the national defenses by bringing the army, militia, and other military forces into closer connection. The United Kingdom is now divided into military districts, with infantry regimental districts (besides cavalry and artillery territorial divisions). The members of the militia volunteer into the reserve, and may thence, in time of emergency, be directly drafted into the regular army.

In practice, the quota of men for each district is raised by voluntary recruitment; but should volunteering fail, a levy by ballot, for which the legal power always exists, would be made on all the inhabitants of the locality between the ages of 18 and 35. Many classes

are exempt from the ballot—e.g., peers, soldiers, volunteers, yeomanry, resident members of universities, clergymen, parish schoolmasters, articled clerks, apprentices, seafaring men, crown employés, free watermen of the Thames; in England, any poor man with more than one child born in wedlock; in Scotland, any man with more than two lawful children, and not possessed of property to the value of £50; in Ireland, any poor man not worth £10, or who does not pay £5 per annum for rent, and has more than three lawful children under the age of 14. The militia battalions are bound, when called by the crown, to assemble annually for any period not exceeding 28 days for training purposes; and the government can embody the whole, or part of the force, at any national crisis. In 1815, the militia had been embodied for nearly 20 years, and the regiments were again embodied almost without exception during the Russian war of 1854-56, and to a considerable extent at the time of the Indian mutiny, 1857-59. The militia now number about 97,000 men. They may not be sent out of the kingdom, except they volunteer, and then only by special permission of parliament. As a defensive or garrison force, setting free the regular army for aggressive operations, the militia is a most valuable institution; and in times of war it has ever been found an admirable training-school whence soldiers volunteer into the permanent forces. Its efficiency has been vastly increased during the last 25 years. When out for training, or embodied for permanent duty, the militia officers and men receive the same pay as regular troops of corresponding arms of the service, and are under the army discipline act, except that no punishment can extend to life or limb. The officers rank with, but junior to, their brethren of the regular army, and are always subject to military law.

American Militia.—The peculiar life of the colonies in America rendered it necessary that the colonists should keep themselves armed and experienced in the use of weapons of defense. Inheriting the institutions of the mother country, the existence of a militia was an assumed matter in their organization. The adoption of the constitution of the United States in 1789 was the subject of innumerable debates and political views and prophecies, and the proceedings of the constitutional conventions concerning the adoption of the clauses relating to the militia are most interesting as a matter of political history; space, however, will not permit an account of them. Singularly enough, South Carolina and Virginia were on the side of giving the government greater power, while Massachusetts and Connecticut were opposed to curtailing the state control.

The majority tried in many instances to yield the very minimum to the general government of the powers deemed essential to that government. But the conviction was general that the militia must be trained with uni-

formity, and be so organized as to become a defense to the nation, and that the only authority to provide therefor was the general government. Hamilton in the *Federalist* fully defended the constitutional plan. Patrick Henry in Virginia was convinced that ruin would follow the adoption of the law. So much concern was felt regarding the militia that among the ten amendments which were promptly made, and declared to be in force 1791, Dec. 15, was that (No. 2) providing 'a well regulated militia being necessary to the security of a free state, the right of the people to keep and bear arms shall not be infringed.' The state constitutions and the state laws have from time to time, and invariably, dealt with the militia of the respective states, and are held by the courts to be controlling, so far as not inconsistent with the federal laws, but they have not been uniform as to service, duty or organization. They have generally provided for organizing those who wished to volunteer, and the respective governors of states are commanders-in-chief of their militia. It has been demonstrated by time that congress by the act of 1792 made an ineffective law, by prescribing uniform duties for the entire male population composing the militia, and though thereafter for over one hundred years the law was retained with slight amendment upon the statute book, it was not enforced and was the subject of repeated efforts at modification. The presidents of the United States, notably Washington, Jefferson, Madison, Adams, Jackson and Van Buren, in their messages to congress, urged further legislation to create an efficient militia. Elaborate reports were made from committees in congress, but nothing was accomplished except that in 1808 an annual appropriation of $200,000 was begun, which was increased in 1887 to $400,000, and in 1900 to $1,000,000. Between 1819 and 1825 various bills and propositions were advanced for a classification of the militia, so that only a small part of it should have duty to perform in time of peace, then a board was convened by the secretary of war which made a report that was transmitted to congress, recommending the instruction of officers in camps of instruction ten days each year. Jackson urged encouraging volunteer organizations. The secretary of war of President Van Buren's cabinet, in 1840, proposed that 100,000 men apportioned to the states be maintained by draft or otherwise, to serve four years, one-fourth to go out each year, and to form the reserve, continuing as such four years more; the president to order the active portion on duty 30 days each year, and defray all charges for pay, subsistence, etc. It is said that no subject, except finance, was more discussed, prior to the civil war, than the militia. The debates in congress are full of it, reports and bills are numerous, both from the war office and the committees of the senate and house, but, as stated, they were unacceptable, until after the war with Spain. The language of

the constitution, 'reserving to the states respectively the appointment of the officers, and the authority of training the militia according to the discipline prescribed by congress,' has always been an insurmountable obstacle to federal control of the militia in time of peace. As indicated, the army and congress long endeavored to secure the adoption of a plan to limit the militia to a practicable number, and the volunteer militia, or that proportion which the states have organized into companies or regiments, has, for many years, been regarded as a practicable number, as indeed it will always be, if motives of patriotism and eagerness to acquire military knowledge can be made the incentives to volunteer, and it be understood by the people that the government wishes to maintain the force to embody such ideals only.

Military Law of 1903.—In 1903, the United States congress adopted a new militia law, by which the militia was defined to be practically all able-bodied males between 18 and 45 years, divided into two classes, namely (*a*) 'the Organized Militia,' being such forces as may be created, under state laws, regardless of the name they bear, and (*b*) the remainder of the militia. A period of five years is given to all the states to adopt laws making the organization, drill and discipline of their organized militia the same as that of the regular army, and the participation of the states in an annual appropriation of $1,000,000 is made dependent on such state action, and the creation of forces accordingly; the limit in number of troops is apparently that of the law as it stood theretofore, to wit, 100 men for each congressional representative; meanwhile those states which have been entitled to participate in the annual fund continue to do so, and at once their forces became a part of the 'Organized Militia.' Authority is given to the president to call forth such number of the militia, 'organized' or 'reserve,' as he may deem necessary, in case of invasion, danger of invasion, rebellion, or inability to execute the laws of the Union, and any officer or enlisted man who shall neglect to present himself to a mustering officer to be mustered into the service of the United States, if found fit, shall be subject to trial by court-martial. No provision is made for such other portion of the militia who may be called forth. The time of such service shall not exceed nine months. The states are required to have each an adjutant general, whose duties the state laws define, except as to reports to the secretary of war; these the latter may prescribe. Provision is made for supplying the states on requisition with arms, belts, equipment, ammunition, etc., the same to remain the property of the United States government. The secretary of war is required to cause annual inspections to be made, and such states as have the requisite organized militia may obtain so much of their allotment from the annual appropriation as shall be necessary to transport, pay and

subsist such portion of their forces as shall engage in field or camp service. The secretary of war may also provide for the participation of any part of the organized militia of any state in any camp or field maneuvers of the regular forces at or near military posts or defenses of the United States. These charges are from the appropriation for the army. The militia appropriation is also available for stores, supplies, or publications; and states may also buy such property at army listed prices. The annual duty required is prescribed, and regular officers may be detailed to states for duty with the organized militia. Ammunition for firing and target practice may be supplied at regular military posts, and officers of the militia may be allowed to attend at military schools or colleges of the United States, and be examined to be certified for fitness to be commissioned. The application of the law will test the wish of the people to put a particular part or all of the militia under the control of national authority. The questions involved are national control of the militia in time of peace, national participation in the control of the militia, national control of all or part of the militia through the officers of the regular army, or national control through some other agency, wholly or in part under direction of the officers of the regular army.

National or State Guard.—For one hundred years the militia has been called the state force, being in time of peace under the state, as in England it was under the county; the new law while recognizing the states' control seeks to secure uniformity and perfection through active national participation in control, and by the contribution of money and property, and is reported by the war department to be in process of successful solution. The term 'National Guard' has been adopted by some states to designate its organized or volunteer militia. This appellation was adopted by one of the most famous militia organizations of the world, the 7th Regiment of New York, at the time Lafayette visited America in 1824, and in his honor, after the 'Garde Nationale.' The state of New York appropriated the term in 1862 to describe the organized militia, and other states have followed; but if the organized militia can be made and kept a volunteer body, founded on patriotic service, the term that Massachusetts has used, 'Volunteer militia,' is more correct. The organized militia of the states bear names as follows: Florida, 'State Troops'; Kentucky, 'State Guard'; Louisiana, 'State National Guard'; Delaware, 'Organized Militia'; Virginia, 'Volunteers'; Massachusetts, 'Volunteer Militia.' The remaining states use the term 'National Guard.' A table compiled in 1907 showed the state militia to comprise 1,129 generals and officers of their staffs, 4,710 cavalry, 7,148 artillery, 92,226 infantry, making a total of 105,213. The total number liable to military service is estimated at 13,800,000 men.

The naval militia of the states aggregated in 1907, 504 officers and 5,225 men. Heretofore militia of the United States meant militia called into the service of the United States. The volunteer militia of many of the states, notably New York, contain some military organizations so excellent in drill, discipline, rifle shooting and general military proficiency as to be easily comparable with corresponding bodies in the regular service. This is attained by the work of men who are fond of military labors, and who have patriotic pride in performing them, and by those who know how to utilize such elements in the community. As the officers and men maintain themselves, and oftentimes those dependent upon them, and have civic and social ambitions, as well as those of a military character, it is necessary to be judicious in selecting and managing volunteers, in order to inculcate military knowledge and maintain zeal for public service. It will thus be seen that the subject of the militia is a political, economic and patriotic question of statecraft. The military sciences and their representatives enter because the question relates to the embodiment of national force, but they enter only for the perfection of a result and not for its creation. The chief executive of a nation is its chief commander, but the military power is subordinate to the civil power, except when the military power must be exercised. Asserting that this should be always kept in mind, Hallam says: 'Nothing would more break down this notion of the law's supremacy than the perpetual interference of those who are really governed by another law; for the doctrine of some judges that the soldier, being still a citizen, acts only in preservation of the public peace as another is bound to, must be felt as a sophism even by those who cannot find an answer to it.'

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MILK, n. *milk* [see MILCH]: white fluid drawn from

the breast of mammiferous females for the nourishment of their young; white fluid yielded by the cow; the white juice of plants: V. to draw or press out the milk of; to draw from the udder of a cow; to add milk to. MILK'-ING, imp. MILKED, pp. *mĭlkt*. MILK'ER, n. *-ẽr*, one who milks. MILKY, a. *mĭlk'ĭ*, yielding milk; full of milk; juicy; whitish, as milky fluid; gentle. MILKILY, ad. *mĭlk'ĭ-lĭ*. MILK'INESS, n. *-nĕs*, qualities like those of milk. MILK'MAID, a woman that milks cows, or is employed in the dairy. MILK-QUARTZ, a compact, vitreous variety of quartz, occurring in veins of the older rocks, of a milk-white color and somewhat greasy lustre. MILK-SNAKE, or CHICKEN-SNAKE (*Ophibolus eximius*), harmless snake, usually small, though sometimes 5 ft. in length; occasionally found in stables, dairies, and houses. It feeds on mice, toads, insects, and little birds. It is of milk-white color above, sometimes tinged with red and with dusky spots, and of silvery or yellowish white below. MILK'SOP, a piece of bread dipped in milk; a soft, effeminate man. MILK'-TEETH, the first or deciduous teeth. MILK'-TREE, a tree yielding a milky juice fit for food; the Cow Tree (q.v.): the juice of the *Tab'ernæmon'tănă utĭlĭs*, ord. *Apocynăcĕæ*. MILK-VETCH (see ASTRAGALUS). MILK-WEED (see ASCLEPIADACEÆ; ASCLEPIAS). MILK'-WHITE, white as milk. MILK-WORT, small wild plant with blue, pink, or white flowers; the *Polyg'ăla vulgāris*, ord. *Polygalăcĕæ* (see POLYGALA). MILKY WAY, the broad white zone or belt seen in the heavens, slightly luminous, ascertained to be formed of innumerable stars; the galaxy (see GALAXY). SUGAR OF MILK. See SUGAR (*Milk Sugar*). MILK OF LIME, slaked lime in water—having a milky appearance.

MILK: opaque white fluid secreted by the mammary glands of females of the class *Mammalia*, after they have brought forth their young, and during the period in which their offspring are too immature to subsist on solid food. It is devoid of odor, except for a short time after its extraction; is of slightly sweet taste, usually of a slightly alkaline reaction (except in the *Carnivora*, in which it is acid); and its average specific gravity (in the case of human milk) is 1032.

When milk has been allowed to stand for some time, a thick, fatty, yellowish-white stratum (the cream) forms upon its surface. When this is removed, the fluid below (popularly known as 'skim-milk') is found to be of greater specific gravity, and of a more bluish-white tint. Milk does not coagulate on boiling, but a membrane or film of coagulated caseine, containing fat corpuscles, forms upon its surface. If milk be allowed to stand for some days exposed to air at the ordinary temperature, it gradually exhibits an increasing acid reaction, from the formation of lactic acid from the milk-sugar; while the caseine, becoming coagulated by the action of the lactic acid, is separated in the form of 'curds,' and

the fluid gradually assumes the form of a thickish pulp. The ordinary means of obtaining the caseine (which exists in solution in the milk) in the form of curds is by the addition of a piece of rennet (the dried stomach of the calf), which acts as powerfully as any acid. The curds thus separated form the basis of cheese, while the fluid portion left after their removal is known as the 'whey.'

The following table, based on the researches of Vernois and Becquerel, represents the density and composition of 1,000 parts of milk in various animals:

	Density.	Water.	Solid Constituents.	Caseine and Extractive Matters.	Sugar.	Fat (Butter).	Salts.
Woman	1032.67	889.08	110.92	39.24	43.64	26.66	1.38
Cow	1033.38	864.06	135.94	55.19	38.03	36.12	6.64
Mare	1033.74	904.30	95.70	32.35	32.76	24.36	5.23
Ass	1034.57	890.12	109.88	35.65	50.46	18.53	5.24
Goat	1033.53	844.90	155.10	35.14	36.91	56.87	6.18
Ewe	1040.98	832.32	167.68	60.78	39.43	51.31	7 16
Bitch	1041.62	772.08	227.92	116.88	15.29	87.95	7.80

The actual caseine, which in the preceding analyses is associated with the undefined group of substances termed *extractive matters*, ranges from 27 to 35 in 1,000 parts of healthy human milk, while in the colostrum (the milk secreted immediately after parturition) it amounts to 40; in the milk of the cow it is somewhat higher; while in that of the bitch, and probably all carnivorous animals, it is more than trebled. It is found in the case of women that the quantity of the caseine increases with the free use of animal food, and diminishes on vegetable diet.

When examined under the microscope, the milk appears as a clear fluid, containing fat globules (the milk globules, as they are usually called) in suspension. They commonly vary from 0.0012 to 0.0018 of a line in diameter. They are each invested with a delicate coat of caseine, which prevents their running together. By *churning*, the surrounding envelopes become ruptured, and the contents are made to unite, forming *butter*. In addition to milk globules, colostrum globules (see COLOSTRUM), which are irregular conglomerations of very small fat globules, occur in the milk for the first three or four days after delivery of the offspring.

The fatty matters range from 25 to 43 in 1,000 parts of women's milk, while in cows' milk they average, according to Lehmann, 45; and in bitches' milk rise to 110. These fatty matters, which collectively form butter, consist of an admixture of 68 per cent. of margarine, 30 per cent. of oleine, and 2 per cent. of an admixture of fats, which, on saponification, yield butyric, caproic,

capryllic, and capric acids. The milk which is last yielded is much richer in fat than that first drawn.

The sugar (for whose properties, see SUGAR [*Milk Sugar*]), varies in human milk from 32 to 62 in 1,000 parts, and in cows' milk from 34 to 43. The milk of bitches, when fed on a purely animal diet, often contains no traces of sugar; but if they are fed on vegetable or mixed food, considerable sugar is found. The salts in women's milk range from 0.6 to 2.5 in 1,000 parts, and in cows' milk from 3.5 to 8.5. That a peculiar selective power is exerted by the mammary gland, is shown by the following table, which shows the comparative analyses of the ashes of cows' milk and of cows' blood, each reckoned for 100 parts:

	Ash of Milk.	Ash of Blood.
Chloride of potassium	14.18	none
Chloride of sodium	4.74	38.82
Potash	23.46	11.44
Soda	6.96	29.09
Phosphoric acid	28.40	7.74
Lime	17.34	1.90
Magnesia	2.20	0.75

Human milk is liable to tolerably regular changes at different periods of lactation—e.g., the sugar is deficient during the first month, and is in excess from the eighth to the tenth month; the caseine is in excess during the first two months, and is most deficient between the tenth and eleventh months; the butter is considerably in excess during the first month, and slightly so for the next two months; while the salts are most abundant during the first month, but present no regular law of decrease. Hence, it will readily be seen that, in the selection of a wet-nurse, one of the leading requirements should be, that her milk should be of the same age as that of the mother's. Various medicines—e.g., iodide of potassium, iodide of mercury, and quinine, have been detected in the milk, after being taken by the mother; and many cases are on record in which strong mental impressions, as fear or anger, acting on the mother, have so far poisoned the milk as to cause immediate convulsions in the infant.

The daily quantity of milk is dependent on various conditions, such as bodily constitution, food, etc. Lampérierre determined the quantity of milk secreted in definite times by a large number of women, and found as a mean for each breast between 50 and 60 c.c (the cubic centimetre being about 15 drops) in the course of two hours, assuming that the secretion continues at uniform rate.

In those cases in which a wet-nurse cannot be obtained, it is expedient to modify cow's milk, so as to make it resemble that of women. The main differences are that the former contains more caseine and less sugar and water than the latter.

The milk of cows is extensively used as an article of

diet both for healthy persons and for invalids, and it enters largely into all hospital, prison, and work-house dietaries. In patients with a tendency to consumption, or in whom that disease has already manifested itself in its early form, cream is often of great service, especially when the stomach cannot bear cod-liver oil.

For the adulterations to which milk is often subjected, see FOOD: for the instruments used for testing the purity of this fluid, see GALACTOMETER, under GALACTIC. Water is by far the commonest adulteration, and if it has been added in large quantity, the fraud may be detected by evaporating a small weighed quantity of the milk (say one ounce) to dryness, and ascertaining whether the due proportion of solid constituents is left.

Various methods have been proposed for the preservation of milk for sea-voyages, etc.: the preparations are named desiccated milk, solidified milk, essence of milk, etc. The best process is that which does not prepare from the milk extracts which are not milk, but that which, by condensing, preserves the milk itself. Gail Borden, of White Plains, N. Y., devised the process of condensation in vacuum pans, in one of which, with boilers of adequate power, 2,000 qts. per hour can be condensed—the water being thus removed: a little sugar is added, and the product, hermetically sealed, may be kept for an indefinite time. Borden's 'plain condensed milk' has no sugar, and may be kept a few days without hermetical sealing. Condensed milk is now largely used.

Owing to its peculiar composition milk is an excellent culture fluid, i.e., one in which bacteria readily proliferate, and consequently, unless it is very clean and kept at a low temperature, its use as food, especially for infants and young children, is liable to cause sickness. Epidemics of disease—typhoid fever, scarlatina, diphtheria, and infantile diarrhea—are often caused by contaminated milk, and it has been shown that tuberculosis, especially in children, may be caused by the milk from tuberculous cows. The contamination of milk with disease germs may occur in a multitude of ways—during milking, from dirt on the udder of the cow, on the hands of the milker, or in the pail into which the milk is received; during transportation, from insufficiently washed cans or by mixture at the central station or creamery with other unclean milk; in the shop, from careless handling, from unwashed dippers, or from a dirty pitcher or other receptacle in which it is carried home; and in the house from careless handling, from exposure, and from feeding in unwashed nursing bottles, especially those fitted with a rubber tube which can never be properly cleansed. At every stage, from the cow to the consumer, it is liable to contamination from exposure to the air, and unless it is kept at a low temperature (below 50° Fahrenheit) the bacteria so admitted rapidly increase in numbers. The greatest care

is necessary to prevent this contamination. The dairy and everything appertaining to it—the barns, the pails, the cows, and the milkers—should be kept scrupulously clean, and the cows should be readily examined at stated intervals by competent veterinarians. Any animal that is found to be tuberculous should be at once isolated and its milk should under no circumstances be used. The best means of preserving milk pure is to cool it at once and then place it in sealed bottles to be opened only by the consumer. This is, however, an expensive process, and the cost to the consumer is so great as to put it beyond the reach of the poor. The danger of contamination of the ordinary milk supply is so great, even with the best of care, that the only safety lies in its sterilization or pasteurization. Both these processes are effected by heat. Sterilization consists in boiling the milk for 10 minutes, which destroys most of the bacteria, though not always their spores. Boiling, however, alters the taste of milk and also changes its constitution, rendering it less fit for food, especially in the case of infants and young children. It is claimed, indeed, that rickets and other diseases may be caused by feeding children on boiled milk. The second process, that of pasteurization, is therefore preferable. This consists in exposing the milk to a temperature of 150° Fahrenheit for 30 minutes, and then cooling immediately to a temperature of 50° and maintaining it at this temperature until it is consumed. By this process most of the bacteria are destroyed, and the spores, which are nor pasteurization will make a really dirty milk clean temperature. Pasteurization does not change the taste of milk nor does it materially alter its constitution so as to affect its nutritive qualities. Neither sterilization nor pasteurization will make a really dirty milk clean nor render it fit for consumption; it merely destroys the existing bacteria and prevents their further growth, but it does not destroy the poisons (toxins) which the bacteria have already elaborated prior to sterilization, nor the material filth—cow dung, dust, hair, etc.—which may have found their way into the fluid at the time of milking or subsequently. Absolute cleanliness at the dairy and during transportation is therefore essential, and no carelessness in this respect should be tolerated whether the milk is subsequently to be sterilized or pasteurized or not. With a little care and experience pasteurization may be done in the home as well, and more cheaply, as in large establishments. The addition to milk of chemical preservatives—boric acid, salicylic acid, formalin, etc.—is injurious and is forbidden by law in most states, and should be in all.

MILK-FEVER: fever which accompanies or precedes the flow of milk. In the lower animals it comes on within a few days after parturition. One variety, common to most animals, consists in inflammation of the

membranes of the womb and bowels, and is produced by exposure to cold, overdriving, or injury during labor; it is treated best with oil and laudanum, tincture of aconite, and hot fomentations to the belly. The other variety (called also 'milk-sickness' and 'trembles'), almost peculiar to the cow, attacks animals in high condition, that are good milkers, and have already borne several calves; it consists in congestion and inflammation of the brain and large nervous centres, and impairs all the vital functions, leading to dullness, loss of sensation and motion, and stupor. Later trembling appears, the animal is obstinately constipated, and extreme thirst is apparent. Blood must be drawn early, while the cow is still standing and sensible. Later, blood-letting only hastens death. A large dose of physic, such as a pound each of salts and treacle, a drachm of calomel, an ounce of gamboge, and two ounces of ginger, should at once be given, solid food withheld, clysters of soap, salt, and water thrown up every hour, cloths wrung out of boiling water applied along the spine, the teats drawn several times daily, and the animal frequently turned. Although treatment is uncertain, prevention is easily insured by milking the cow regularly for 10 days before calving, feeding sparingly on laxative unstimulating food, giving several doses of physic before, and one immediately after, calving; and when the animal is in very high condition, and prone to milk-fever, bleeding her a day or two before calving. Early medical writers described a similar affection in man, supposed to be caused by drinking the milk of diseased cows. It was probably some other disease, possibly typhoid fever.

In women, there is a tendency to this fever, but the development is usually very slight, in some cases scarcely noticeable. Its time for appearance is about the third day after parturition, and robust or plethoric women are most affected by it. It usually passes away of itself without special treatment.

MILK-SICKNESS. See MILK-FEVER.

MILL, n. *mĭl* [AS. *mylen;* W. *melin;* Dut. *molen;* Ger. *mühle;* Gr. *mulē;* L. *mola,* a millstone or mill: L. *molĕrĕ;* Ger. *mahlen;* Goth. *malan;* W. *malu,* to grind]: a machine in which corn and other substances are ground into meal and flour; a machine for spinning, weaving, sawing, or for performing other operations; the building in which such operations are carried on: V. to grind; to press or stamp, as the edges of coins; to full, as cloth; to cause to froth, as to mill chocolate. MILL'ING, imp.: N. the act or employment of grinding; the act of being operated on by machinery; the act of making indented or rough edges on coins; the rough edges thus made. MILLED, pp. *mĭld:* ADJ. passed through a mill; operated on by machinery; having the edge indented or slightly toothed, as coins. MILLER, n. *mĭl'ẽr,* one who keeps or attends a corn-mill; a certain winged insect. MILL'-

BOARD, a stout pasteboard made in a mill in the same way as ordinary paper. MILL′-DAM, the barrier of stone and wood placed in the bed of a stream to retain the water and raise its level for the purpose of turning a mill-wheel. MILL′-POND, a reservoir of water to turn a mill. MILL′-RACE, the stream that drives a mill. MILL′-STONE, one of the grinding-stones of a mill (see BUHR-STONE). MILLSTONE-GRIT, a hard gritty variety of Carboniferous sandstone, species of conglomerate extensively used in England for millstones; a division of the Carboniferous system, between the Carboniferous limestone and the Coal-measures. In the Appalachian range in Penn. it is more than 1,200 ft. thick, a coarse siliceous conglomerate; in Va. it is chiefly sandstone, about 1,000 ft. thick; in Ala. it is quartzose, and used for grindstones. MILL′-WRIGHT, one who constructs and repairs mills. MILLED LEAD, *mĭld lĕd*, lead rolled out into sheets by machinery. TO SEE INTO OR THROUGH A MILLSTONE, to be acute; to be sharp-sighted mentally.

MILL, v. *mĭl* [see MILL 1]: in *slang*, to beat severely with the fists; to bruise by boxing with the clenched hands: N. a prize-fight. MILL′ING, imp. MILLED, pp. *mĭld*, well pounded or thrashed with the fists.

MILL, n. *mĭl* [L. *millĕ*, a thousand]: in the *United States*, an imaginary money of account, the tenth of a cent, or the thousandth of a dollar.

MILL, in Law: a property carrying certain riparian rights. The owner of a mill situated on the bank of a stream is entitled to the use of the stream undiminished in volume; and if other riparian owners above interfere with the stream by diminishing its volume, thereby causing injury to the mill, the mill-owner has a right of action against them.

MILL, GRIST: machinery for grinding; also manufactory containing such machinery, for reducing grain to meal or flour.

From time immemorial, grain has been ground by a pair of stones. The earliest and rudest hand-mills were, no doubt, somewhat like that shown in fig. 1, a representation of one sent to England by Dr. Livingstone, the African traveller, from the banks of the Shiré, in s. Africa.

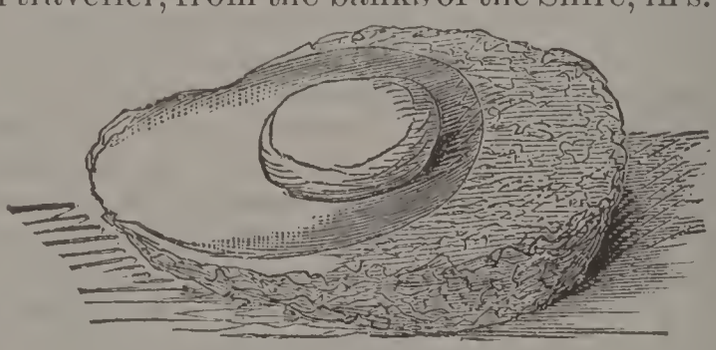

Fig. 1.—African Hand-mill.

He describes it as 'a mill such as Sarah used, when told by her lord to do the thing handsomely and in a hurry

for the strangers—i.e., a big stone worn hollow by the operations of grinding. The upper stone is grasped by both hands, and the weight of the body brought down on it as it is shoved to the lower part. . . . The meal is made very fine.' The next step in advance of this was the quern or hand-mill, still in use in the Shetland Isles, the Faröes, and other places. The old quern scarcely differs from a pair of modern millstones, except in the stones being small enough to allow of the upper one being turned by the hand, instead of by wind, water, or steam-power.

The millstones now almost universally used for grinding corn or grain are made from buhrstone, a form of silica like flint in hardness, but not so brittle. This rock is found in abundance only in the mineral basin of Paris and some adjoining districts, and belongs to the Tertiary formation. It is of cellular texture, and is frequently full of silicified shells and other fossils. Millstones are usually four to six ft. in diameter, and are each made up of a number of pieces strongly cemented and bound together with iron hoops. One six ft. in diameter, of fine quality, will cost about $250. The grinding surface of each stone is furrowed or grooved in the manner shown in fig. 2, the grooves being cut perpendicularly on the one side, and with a slope on the other.

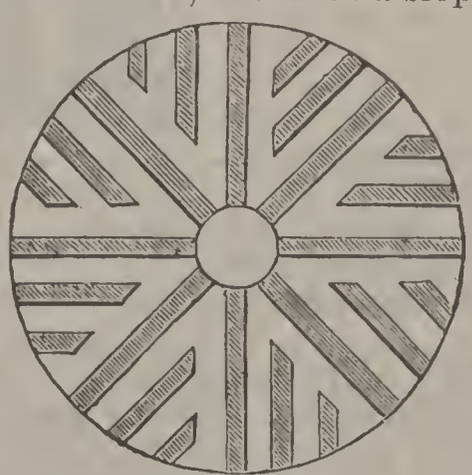

Fig. 2.—Millstone, showing Grinding Surface.

A pair of stones are used together, and both being furrowed exactly alike, the sharp edges of the grooves on the one come against those on the other, and so cut the grain to pieces.

Fig. 3 shows a section of a flour-mill reduced to its simplest elements. The millstones are at *a*, the lower of which is firmly fixed, it being a matter of importance to have this done securely; and the upper is made to revolve, on a shaft which passes up through the lower one, at a speed of one hundred revolutions per minute, more or less. Motion is communicated by the spur-wheel *b*, driven by a water-wheel or other power. The grain, previously cleaned, is supplied to the millstones by means of the hopper *c*, connected with which there is a valve, *d*, for regulating the supply. Passing through a hole in the centre of the upper millstone, it comes in be-

tween the two, where it is ground, and thrown out on all sides by means of the centrifugal force. The millstones are, of course, inclosed, and the flour passes down through the spout *e*, to the worm at *f*, which, while it cools the ground grain, carries it along to elevators *g*. These raise it up to the floor, on which the silk dressing-machine, *h*, is placed. This is a cylinder, which was formerly made of wire-cloth of various degrees of fineness, and consequently separated the flour into different qualities—the finest passing through the first portion, the second passing through the next, and so on; but no

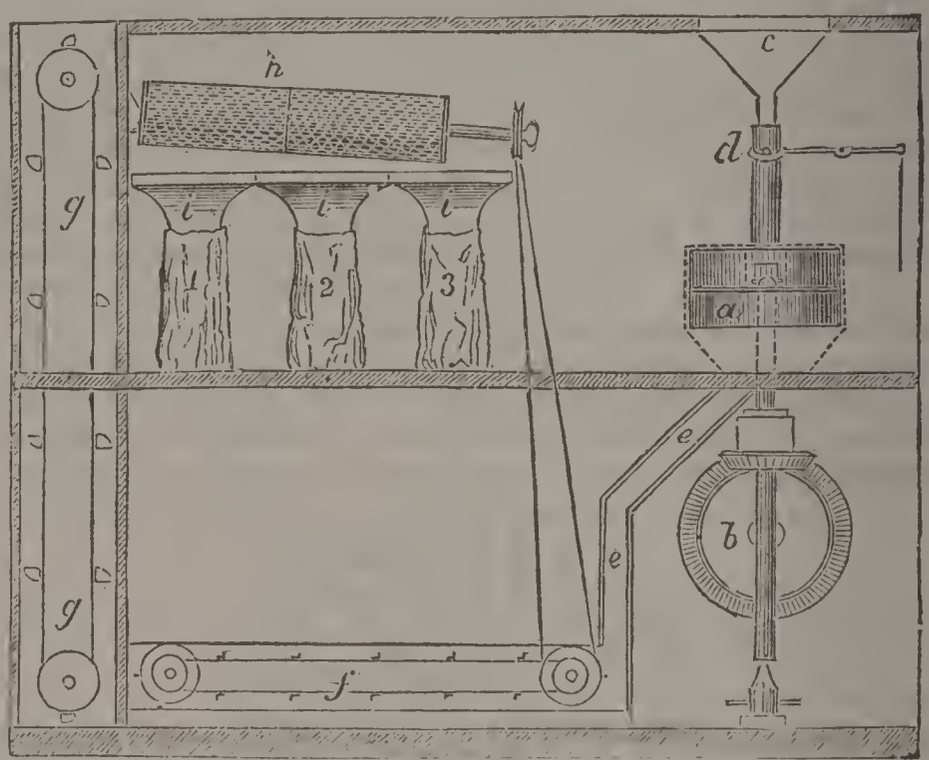

Fig. 3.—Elementary Section of a Flour-mill.

part of it large enough in the openings to let through the bran, which passed out at the end. Silk is now preferred to wire-cloth for dressing the flour. Hoppers, *i*, are placed below the dressing-machine, by means of which the flour and bran are filled into sacks, No. 1 being fine flour; No. 2, seconds; and No. 3, bran.

In a large and well-appointed mill, the wheat passes through a series of cleaning or smut-machines (consisting of rapidly revolving beaters inside an iron case) and through winnowing machines. After being slightly crushed between iron rollers and passed through a wire dressing or sifting machine, the wheat is crushed by 48 pairs (or other adequate number) of millstones. It is then sifted by means of silk cylinders—first to separate the bran, and a second time to separate the 'middlings' or 'parings.' What falls through the second set of silk machines is finished flour. The middlings are then subjected to a sifting process by means of 'middlings-purifiers.' These, which are horizontal sieves, are kept constantly in motion, and through them a current of air is made to pass by the suction of a fan. Thereafter, the middlings are ground by means of porcelain rollers, and

dressed through silk in the same way as the ground wheat, the flour thus obtained being mixed with that from the millstones. All the machinery is combined by means of elevators and screws in such a way that no manual labor is required for the conveyance of the material, from the time when it enters the mill as wheat to that at which it falls into sacks as flour, the process of manufacture occupying half an hour. One such great mill manufactures about 1,000 sacks of flour per day of 24 hours.

There is a form of mill in use for some purposes where the millstones are vertical, as shown in fig. 4, and called the edge-stone mill. It is sometimes, though rarely, used for grinding grain; but is much employed for crushing oil-seeds and for grinding dye-stuffs, sugar, chemicals, and a multitude of other substances. The stones are generally of some hard rock, such as granite or sandstone, and from 5 to 7 ft. in diameter. For such purposes as grinding clay or loam, they are usually made of cast-iron and of smaller size. The stones revolve in opposite directions, sometimes upon a fixed stone or metal bed, and at other times it is the bed-plate itself which revolves, and in so doing turns the edge-stones which rest upon it.

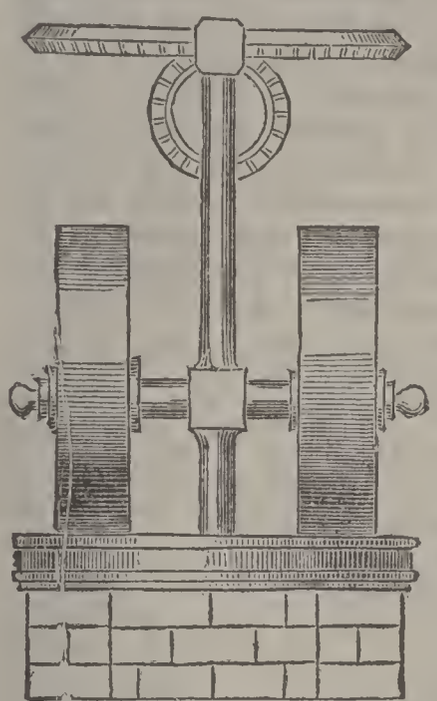

Fig. 4.—Edge-stone Mill.

Among recent improvements in flour-mills are: 1. The high-grinding system by means of rollers—either of chilled iron or of porcelain—in place of stones, suited to hard wheats, and carried out with great success in Hungary, particularly in Buda-Pesth, whence for many years have come the finest qualities of flours. Of late years, the millers of Minnesota have copied this system; and as they are favored by having a similar quality of wheat, they are successfully contesting the European markets with the Hungarians. 2. Middlings-purifiers (mentioned above), which vary very much in construction, but have the same leading principle—viz., making use of the difference of specific gravity of flour and bran, to effect a separation between them. By means of these machines, flour of very fine quality can now be made from material formerly used for feeding purposes. These middlings-purifiers are the leading feature in the American 'New Process' milling, now universally adopted in this country; and it is largely owing to the help of this apparatus that the Americans are now so keenly competing with foreign millers

MILL, JAMES: historian, political economist, and mental philosopher: 1773, Apr. 6—1836, June 23; b. in the neighborhood of Montrose, Scotland; son of a shoemaker. His mother was ambitious of a career for her son and resolved that he should have an education. He studied, with a view to the ministry, at the Univ. of Edinburgh, where he distinguished himself in Greek and in moral and metaphysical philosophy. He was licensed to preach 1798; but turned from the ministry and went to London 1802, where he settled as a literary man. He became editor of the *Literary Journal*, which after a time was discontinued; and wrote for various periodicals, including the *Eclectic* and the *Edinburgh Review*. In 1806 he commenced his *History of British India*, which with untiring industry he carried on with other literary work, and published in the winter of 1817–8. The impression produced by this masterly history on the Indian authorities was such that, 1819, the court of directors of the company appointed M. assistant-examiner of Indian correspondence, notwithstanding the unpopularity of his well-known radical opinions. The revenue dept. was assigned to his care and he continued its superintendence till four years before his death, when he was appointed head of the examiner's office, where he had control of all the departments of Indian administration —political, judicial, and financial—managed by the secret committee of the court of directors. Shortly after his appointment to the India house, he contributed to the *Encyc. Brit.*, 5th ed., the articles on government, education, jurisprudence, law of nations, liberty of the press, colonies, and prison discipline. These essays were reprinted in separate form, and became widely known. The powers of analysis, of clear statement, and of thorough application of principles, evinced in these articles, had probably never before been brought to bear on that class of subjects, whose treatment had been mainly empirical. In 1821–2 he published *Elements of Political Economy*, prepared primarily with a view to the education of his eldest son, John Stuart M. In 1829, his *Analysis of the Human Mind* appeared. His last published book was *Fragment on Mackintosh*, 1835. He was a contributor to the *Westminster Review* and to the *London Review*, which merged in the *London and Westminster*.

Not long after he settled in London, he made the acquaintance of Jeremy Bentham, and for a number of years lived during the summer in Bentham's country-house. Although he must have derived much benefit from his intercourse with the great law-reformer, he was not a mere disciple of Bentham, but a man of profound and original thought, as well as of great reading, in all departments of moral, mental, and political philosophy. His conversation was impressive, and he gave powerful intellectual stimulus to a number of young men, some of whom (including his own son, and Mr. Grote, historian of Greece) have risen to eminence. He took a leading

part in founding University College, London. He died at Kensington. See *Autobiography of John S. Mill*, the biography by Prof. Bain in *Mind*, 1876–78, and his *James Mill* (1882).

MILL, John, D.D.: about 1645–1707, June 23; b. Shap, Westmoreland, England. He graduated from Queen's College, Oxford, 1669; was tutor there several years, and 1676 was appointed chaplain to the bp. of Oxford. In 1681 he became rector of Blechingdon, Oxfordshire, and chaplain to Charles II. He was appointed 1685 principal of St. Edmund's Hall, which position he held till his death, and 1704 became prebendary of Canterbury, to which office he was nominated by Queen Anne. The great work of his life, which he carried on at his own expense and to which he devoted 30 years, was an edition of the *Greek Testament, with Various Readings*, for which he collected from numerous sources more than 30,000 readings. In two weeks after its completion he died at Oxford. A reprint of his *Testament*, with additional readings, was issued Amsterdam, 1710.

MILL, John Stuart: social and political economist, logician, and mental philosopher: 1806, May 20—1873, May 8; b. London; son of James M., who educated him at home on a theory of his own. The boy was taught the Greek alphabet at the age of three, and by his eighth year had read Plato and many Greek books—probably with little real instruction from their contents, but with profitable intellectual discipline. In 1820 he went to France, where he lived for more than a year, making himself master of the French language, and occasionally attending public lectures on science. He lived for some time at Paris, in the house of the French economist, Jean Baptiste Say, where he made the acquaintance of many men distinguished then, or afterward, in letters and in politics. He spent part of his time in s. France, in the house of Sir Samuel Bentham, brother to Jeremy Bentham. During this stay in France, he laid the foundation of his great familiarity with, and interest in, the politics as well as the literature of the French nation. In 1823 he entered the India house, and became a clerk in the examiner's office, where his father was assistant-examiner. For 33 years he continued to be occupied in the dept. of the office named the Political, or the transactions of the E. India company with the native states. In 1831 he was appointed assistant-examiner, and 1856 was placed at the head of the department. He energetically opposed the transfer of the India government to the crown 1858. On account of failing health he declined a seat at the new Indian council, and retired from office 1858, Oct., on a compensating allowance. At the general election of 1865, M. was returned to parliament for Westminster; and till he lost his seat at the election of 1868, he acted with the advanced liberals. He died at Avignon, where he had spent most part of the last years of his life.

Mill became an author at a very early age, and is considered one of the foremost thinkers of his time. His first publications were articles in the *Westminster Review.* He was active in the political discussions that followed the revolution of 1830 in France, and the Reform-Bill movement in England; and 1835-40 was editor and, with Sir W. Molesworth, proprietor of the *London and Westminster Review,* where many articles of his own appeared. As political economist and mental philosopher Mill may be justly criticised as putting forth various untenable doctrines: his field was very broad, and he was not equally at home in all parts of it—a fact which he failed to note, especially in relation to the deeper spiritual experiences of the human soul. Moreover, his father's assiduous and severe training had been professedly aimed in Mill's childhood to develop in him an intellectual skepticism as his unchanging attitude of thought. Nevertheless his service to political economy has been very great, in setting economic inquiries in their proper scope and their due relations to social and governmental conduct, and in giving political economy such organization as is possible to it on the basis laid by Ricardo. Certainly Mill was an earnest intellectual seeker after truth, and a lover of clear thought; and as certainly his handling of any subject gave a profitable stimulus to the whole public mind.—In 1843 he published his *System of Logic,* in which the theory of induction received most notable scientific treatment; 1844, *Essays on some Unsettled Questions of Political Economy;* 1848, *Principles of Political Economy;* 1859, essay on *Liberty;* 1860, *Discussions and Dissertations;* 1863, *Utilitarianism,* the classical formulation of this ethical theory; 1865, *Comte and Positivism,* and the *Examination of Sir William Hamilton's Philosophy;* 1867 (when Mill was rector of St. Andrews University), his *Inaugural Address;* 1868, *England and Ireland;* 1869, *The Subjection of Women.* After his death appeared his *Autobiography* (1873), read with intense interest; *Three Essays on Religion* (1874); and a second volume of *Discussions and Dissertations* (1875). See Bains' *John Stuart Mill.*

MILLAIS, *mĭl-lā'*, Sir JOHN EVERETT, Bart. R.A.: English painter: b. 1829, Southhampton; d. London 1896, Aug. 13. He entered the Royal Academy at 11, and in 1847 carried off the gold medal for his picture of *The Tribes of Benjamin seizing the Daughters of Shiloh,* exhibited, in the following year, at the British Institution. Before this period, he had acquired reputation among younger painters by his avowed antipathy to the principles of art which then prevailed. His views were shared by other students, such as Holman Hunt, Dante Rossetti (q.v.), and Charles Collins; and a sort of artistic fraternity was formed, which obtained the name *Pre-Raphaelite School.* Millais' principal paintings are: *Our Savior* (1850), *Mariana in the Moated Grange*

JOHN STUART MILL.

(1851), *The Huguenot* and *Ophelia* (1852), *The Order of Release* and *The Proscribed Royalist* (1853), *The Rescue* (1855), *Autumn Leaves* (1856), *The Heretic* (1858), *Spring Flowers* (1860), *The Black Brunswicker* (1861), *My First Sermon* (1863), *My Second Sermon* (1864), *Joan of Arc* (1865), *Sleeping, Waking, Jephtha* (1867), *Moses* (1871), *Chill October* (1871), *A Day Dream* (1874), *Sound of Many Waters* (1877), *The Princes in the Tower* (1878), etc. The pre-Raphaelitism, intenseness, and extreme anti-traditionalism of Millais' earliest years were gradually toned down; his mature skill shows remarkable force of color and breadth.

MILLAU', or MILLAUD'. See MILHAU.

MILLBURY, *mĭl'bĕr-ĭ:* town and railroad junction, Worcester co., Mass.; 6 m. s. of Worcester; on the New York, New Haven & Hartford and the Boston & Albany railroads. It has numerous churches, a high school, a library and two banks. The Blackstone river furnishes abundant water-power for its numerous and varied manufactures. Within the limits of the town are cotton and woolen mills, a foundry, lumber-mills, carriage and whip shops, and manufactories of cutlery, stockings, and shoes. Pop. (1900) 4,460; (1910) 4,740.

MILLEDGE, *mĭl'ĕj,* JOHN: 1757—1818, Feb. 9; b. Savannah, Ga. He studied law, joined the colonists at the opening of the Revolution, and was one of the party that committed the first overt act of rebellion in the state by capturing the royal governor, Sir James Wright. He rendered excellent service in the army; became attorney general of Georgia 1780; served several terms in the legislature, three terms and part of a fourth in congress, and resigned to become governor of the state; was in the United States senate 1806-09, presiding over that body in the latter year. He was one of the founders and benefactors of the state university. The town of Milledgeville was named for him.

MILLEDGEVILLE, *mĭl'ĕj-vĭl:* city, capital of Baldwin co., Ga.; on the Oconee river and Georgia and Central of Georgia railroads; 85 m. s.e. of Atlanta, 145 m. w.n.w. of Savannah. It is near the geographical centre of the state; and streams nearby furnish natural drainage and water-power. The dam of the Oconee increases the water-power. The place was settled in 1803, received its city charter in 1836, and was named in honor of John Milledge (q.v.). From 1807 to 1867 it was the capital of the state, when it was superseded by Atlanta. It is the seat of the state lunatic asylum, the state penitentiary and the Georgia Military College, the Georgia Normal and Industrial College, and a State School for Girls; contains the former state capitol (now the military college) and governor's mansion; had its public buildings burned by General Sherman's army 1864. Pop. (1900) 4,219; (1910) 4,385.

MILLEDOLER, *mĭl'dol-ẽr*, PHILIP, D.D.: 1775, Sep. 22—1852, Sep. 23; b. Rhinebeck, N. Y. He graduated from Columbia College 1793, studied theology, was settled 1795 over the Nassau st. German Ref. Chh., New York, where he preached in German and English; became pastor 1800 of Pine st. Presb. Chh., Philadelphia, and 1805 of the Rutgers st. Presb. Chh., New York. In 1813 he was settled over the Collegiate Ref. Dutch Chh., New York, and remained its pastor till 1825, when he became prof. of theology in the seminary at New Brunswick and pres. of Rutgers College, which offices he held till 1841. He was a powerful preacher and was specially gifted in public prayer. He was prominent in founding the American Bible Soc.; moderator of the Presb. General Assembly 1808, and pres. of the General Synod of the Ref. Church 1823. The last 10 years of his life were spent in retirement. He died on Staten Island, N. Y.

MILLEFOIL: see MILFOIL.

MIL'LENARY PETI'TION: see HAMPTON COURT CONFERENCE.

MILLENNIUM, n. *mĭl-lĕn'ĭ-ŭm* [L. *millĕ*, a thousand; *annus*, a year]: long, indefinite, final period or age (vaguely, a thousand years) in the world's history, which, as some students of the prophetic Scriptures maintain, is to be introduced by the second coming of Christ, who is to administer his kingdom in visible presence on the earth during the millennial age; in which period also Satan will be bound. MILLENARIAN, a. *mĭl'lĕ-nā'rĭ-ăn*, consisting of a thousand; millennial: N. one who believes in the millennium. MIL'LENA'RIANISM, n. *-rĭ-ăn-ĭzm*, doctrine of the millenarians. MILLENARY, a. *mĭl'lĕn-ăr-ĭ*, consisting of a thousand: N. the space of one thousand years. MILLENNIAL, a. *mĭl-lĕn'nĭ-ăl*, pertaining to the millennium or one thousand years. MILLEN'NIALIST, n. *-ĭst*, one who believes that Christ will reign on the earth in visible person for one thousand years.—The *Millennium*, as a period of great advancement, prosperity, and general triumph of the gospel among men, is expected by multitudes who are not millenarians, since they do not accept a principle fundamental in millenarian belief—that the second coming of Christ, with the 'first resurrection' of the righteous dead and the 'translation' of the righteous living, will precede and introduce the millennial reign. As more definitely denoting this millenarian view, it is frequently termed *pre-millenarianism*—with reference to the visible coming of Christ *before* the millennium.

The idea of a M. originated proximately in the Messianic expectations of the Jews; but more remotely, it has been conjectured, in the Zoroastrian doctrine of the final triumph of Ormuzd over Ahriman; and later it was connected by the Christians with the *Parousia*, or second coming of Christ. The notion of a golden age, preserved by the converts from heathenism to Christianity, as well as the oppression and persecutions to

which they were long subjected by the state authorities, would naturally tend to develop and strengthen such hopes. The chief basis of the millenarian idea in Judaism as well as in Christianity, however, is the ardent hope for a visible divine rule upon earth, and the identification of the church with that of which it is merely a symbol. In the 1st c. of the church, millenarianism (the Greek equivalent of which, *chiliasm*, from *chilioi*, a thousand, is the term employed by the Fathers) was a widespread belief, to which the Book of Daniel, and more particularly the pictorial predictions of the Apocalypse (chaps. xx. and xxi.), gave an apostolical authority; while certain prophetical writings, composed at the end of the 1st and the beginning of the 2d c.—e.g., the *Testament of the Twelve Patriarchs*, the *Fourth Book of Esdras*, the *Revelation of St. Peter*, etc.; also the *Christian Sibylline Books*, the *Epistle of Barnabas*, the *Shepherd of the Pseudo-Hermas*, several Midrashim, Targums, and other works partly legendary embodied in the *Talmud*—lent it a more vivid coloring and imagery. The unanimity which the early Christian teachers exhibit in millenarianism proves how strongly it had laid hold of the imagination of the church, to which, in this early stage, immortality and future rewards were to a great extent things of this world as yet. Not only the heretic Cerinthus, but even the orthodox doctors—e.g., Papias, bp. of Hierapolis, Irenæus, Justin Martyr, etc.—delighted themselves with dreams of the glory and magnificence of the millennial kingdom. The *Sibylline Books*, for instance, hold that the earth will be cultivated throughout its length and breadth, that there will be no more seas, no more winters, no more nights; everlasting wells will run honey, milk, and wine, etc. Papias, in his collection of traditional sayings of Christ (*Kuriakōn Logiōn Exēgēseis*), indulges in the most monstrous representations of the rebuilding of Jerusalem, and the colossal vines and grapes of the millennial reign. Every vine will bear 10,000 branches, every branch 10,000 shoots, every shoot 10,000 sprigs, every sprig 10,000 bunches, every bunch 10,000 berries, every berry 36 times 25 gallons of wine; and if a saint come to pluck a berry, they will all cry out: 'Pluck me, O Saint, I am better, and praise the Lord through me.' The Talmud calculates the height of the men of the M. to be, as before the Fall, 200–900 yards; the moon shall be, according to a prophetical dictum, like the sun; the sun shall be increased 343 times; and every Israelite will beget as many children as there were Israelites going out from Egypt—60,000. Each grape will be large enough to fill the biggest ship. Above all, however, the land of Israel will be free again, and the primitive worship restored with unheard-of splendor. 'Such a chiliasm,' Neander justly remarks, could only 'promote a fleshly eudaimonism;' and, indeed, ere long it called into more energetic activity the opposition of Gnostic spiritualism. According to the general opinion, which was as much Christian as

Jewish, the M. was to be preceded by great calamities, reminding us in some degree of the Scandinavian Ragnarök (or 'Twilight of the Gods'). The personification of evil appeared in *Antichrist*, the precursor of Christ (identified, during the 1st c., with Nero), who would provoke a frightful war in the land of Magog (Ezek. xxxviii., xxxix.), against the people Gog, after which the Messiah—some say a double Messiah: one, the son of Joseph, vanquished in the strife (see MESSIAH); the other, the victorious son of David—would appear, heralded by Elias, or Moses, or Melchizedek, or Isaiah, or Jeremiah, and would bind Satan for a thousand years, annihilate the godless heathen or make them slaves of the believers, overturn the Roman empire, from the ruins of which a new order of things would spring forth, in which the 'dead in Christ' would arise, and with the surviving saints enjoy an incomparable felicity in the city of the 'New Jerusalem,' which was expected to descend literally from heaven. To the innocence which was the state of man in Paradise, there were added, in the prevalent notions of the M., the finest physical and intellectual pleasures.

In the Mosaic account of creation, we find the primitive ground for making the victorious era of the church last a thousand years. That account was regarded by the Jews and by the Judaic Christians as a type of the destinies of creation. Now, by a strictly literal interpretation of the 4th verse of Ps. xc., it was supposed that a day of God was arithmetically equal to a thousand years; hence the six days of creation were understood to indicate that the earth would pass through 6,000 years of labor and suffering, to be followed by a seventh day—i.e., 1,000 years of rest and happiness. In the Book of Revelation (xx.) this view is presented. Still, the rabbinical traditions differ widely among themselves as to the duration of the happy period. Instead of 1,000 years, some of them count 40, 70, 90, 365, 400, 600, 2,000, or 7,000, or so many years as have elapsed from the creation of the world or the flood. The Gospel of Nicodemus makes it 500 years, etc. In fact, the systems of apocalyptic chronology were of varied and arbitrary cast, according as their originators laid greater stress on the Apocalypse, the Book of Daniel, the Song of Songs, the Jewish 'Gematria,' or Computation of Letters—a very pliable art in itself—or on astronomy, astrology, 'natural phenomena,' and the like.

The lapse of time, chilling the ardor of the primitive Christian belief in the nearness of the *Parousia*, had without doubt also the tendency to give a more shadowy, and therefore a more spiritual, aspect to the kingdom over which the expected Messiah was to reign. The influence of the Alexandrian philosophy contributed to the same result. Origen started the idea that, instead of a perpetual opposition of paganism to Christianity—instead of a final and desperate conflict between the two—instead of an insolent triumph on the part of the saints, and a

servile submission on the part of the unbelievers, the real progress and victory of Christianity would consist in the gradual spread of the truth throughout the world, and in the voluntary homage paid to it by all secular powers. This was an immense advance on the views previously entertained. It is owing largely to Origen and his disciple Dionysius that more spiritual conceptions of the M. finally established themselves in the church; at all events, they furnished the Fathers with the majority of their arguments. Yet even in the Egypto-Alexandrian Church, millenarianism in its most literal form (not the more spiritualized millenarianism which in our day expresses the longing hope of many eminent Christians) was widely diffused, and was eradicated only by the great wisdom and moderation of Dionysius. The Montanists (q.v.) generally, as might be expected from the enthusiastic tendencies of the sect, were extreme millenarians or chiliasts, and, being considered a heretical sect, contributed largely to bring Chiliasm into discredit; or, at all events, their own carnal form of chiliasm, which Tertullian himself attacked. Caius, the presbyter, in his *Disputation* against the Montanist Proclus, traces the origin of that form to the hated heretic Cerinthus, whom he accuses of forging a certain revelation, which he passed off as the work of an apostle. From his description of this revelation, it is almost certain —strange as it may appear—that Caius is alluding to the canonical Apocalypse. Lactantius, in the beginning of the 4th c., was the last important church Father who indulged in chiliastic dreams; among its earlier advocates were Nepos, Methodius, Korakion, Apollinarius, Victorinus, etc. In the 5th c., St. Jerome and St. Augustine expressly combated certain fanatics who still hoped for the advent of a millennial kingdom whose pleasures included those of the flesh. But from this time the church formally rejected millenarianism in its sensuous 'visible' form, though the doctrine every now and then made its reappearance suddenly and obstinately, especially as a general popular belief. Thus the expectation of the *Last Day* in the year 1,000 reinvested the doctrine with a transitory importance; but it lost all credit again when the hopes so keenly excited by the Crusades faded away before the stern reality of Saracenic success, and the predictions of the *Everlasting Gospel*, a work of Joachim de Floris, Franciscan abbot (died 1212), remained unfulfilled.

At the period of the Reformation, millenarianism once more experienced a partial revival, because it was not difficult to apply some of its symbolism to the papacy. The pope, e.g., was *Antichrist*—a belief still retained in some extreme Protestant creeds. Yet the doctrine was not adopted by the great body of the Reformers, but by some fanatical sects, such as the Anabaptists, and by the Theosophists of the 17th c. Also during the civil and religious wars in France and England, when excitement prevailed, it was prominent. The *Fifth Monarchy Men*

of Cromwell's time were millenarians of the most exaggerated and dangerous sort. Their peculiar tenet was, that the M. *had* come, and that *they* were the saints who were to inherit the earth. The excesses of the French Rom. Cath. mystics and Quietists terminated in chiliastic views. Among the Protestants, it was during the Thirty Years' War that the most enthusiastic and learned chiliasts flourished. These may—broadly—be brought under the three chief heads of *Exegetical* Chiliasts, who, by some biblical dates, endeavored to compute the predicted time; *Alchemistic* or *Cabalistic* Chiliasts, who endeavored to hasten the period by some mystical discovery; and *Politico-theocratic* Chiliasts, who wished to reduce the governments of the world to a biblical standard: see ANABAPTISTS: MÜNZER. The awful suffering and widespread desolation of that time led pious hearts to solace themselves with the hope of a peaceful and glorious future. Since then the predilection which has sprung up for expounding the prophetical books of the Bible, and particularly the Apocalypse, with a view to present events, has given the doctrine a faint semi-theological life, very different, however, from the earnest, practical faith of the first Christians. Among the foremost chiliastic teachers of modern centuries are Ezechiel Meth, Paul Felgenhauer, Bp. Comenius (*Lux in Tenebris*, 1657), Prof. Jurieu (*L'Accomplissement des Prophéties*, 1686), Serarius (*Assertion du Regne de Mille Ans, etc.*, abt. 1670), Poiret (*Economie Divine*, 1687), J. Mede (*Clav. Apocal*, 1627). Thomas Burnet and W. Whiston endeavored to give chiliasm a geological foundation, but without finding much favor. Spener, on account of his *Hoffnung besserer Zeiten*, has been deemed a chiliast; no less Joachim Lange (*Licht und Recht*); and Swedenborg employed apocalyptic images to set forth the transfigured world of the senses. Latterly, especially since the rise and extension of missionary enterprise, the opinion has obtained wide currency that, after the conversion of the whole world to Christianity, a blissful and glorious era will ensue; but not much stress—except by extreme literalists—is now laid on the nature or duration of this far-off felicity. In fact, the common vague Christian conception of a M. without a visibly present Christ, as held at the present day, is little different, so far as results are concerned, from the belief of philosophers in the perfectibility of the race. The essence of both conceptions is the cessation of sin and sorrow, the prevalence of holiness and happiness. But this departs widely from the 'ancient hope of the church'—a kingdom of visible majesty, with Jesus and the saints ruling the world from Jerusalem, the central city of the earth.

In quite recent years an enthusiastic millenarianism of the more spiritual type has seized on some men in Britain, and still more in the United States, who are held in high honor in their various denominations. What they lack in numbers, they make up in fervor. At least their argument and appeal have done the modern church

this service—they have called attention to a range of sublime but dim truths which have become an almost forgotten heritage from the early church. It is probable that the great body of Christian thinkers on this theme are not at rest in either the common or the millenarian theory. Probably, in the words of a recent writer, 'it is felt that while the strict pre-millennial view, from a flat literal interpretation of a few texts, tends toward an external and materialistic handling of noble spiritual facts, the opposite and usual view tends toward dissolving all spiritual facts in a vast sea of symbolism, and this on a principle of interpretation by which almost any words in Scripture can be turned to almost any meaning. The usual expedient of seeking a third view carefully limited between the two extremes, and antagonizing both, seems scarcely feasible in this case. The truth, when found, will probably be not between, but *combining*, both—not so much rejecting either as solvent and comprehensive of both in some more vital range of thought.'

Great eagerness and not a little ingenuity have been exhibited by many persons in fixing a date for the commencement of the M. The celebrated theologian, Johann Albrecht Bengel (*Erklärte Offenbarung: Reden für's Volk*), who, in the 18th c., revived an earnest interest in the subject among orthodox Protestants, asserted from a study of the prophecies that the millennium would begin 1836. This date was long popular. Bengel's general millenarianism was adopted by Oetinger (d. 1782), and widely spread throughout Germany, in a more or less poetic form, by Hahn, Crusius, Jung Stilling, Lavater, and Hess (*Briefe über die Offenb. Joh.*). Some of the greatest of the more recent German theologians are millenarians, such as Rothe, Delitzsch, Hoffmann, Kurtz, Hebart, Thiersch, Nitzsch, P. Lange, and Ebrard. Swedenborg held that the last judgment took place 1757, and that the New Church, or 'Church of the New Jerusalem,' as his followers designate themselves—in other words, the millennial era, then began. In the United States considerable agitation was excited by the preaching of William Miller (q.v.), who fixed the second advent of Christ about 1843. Of late years, the most noted English millenarian was Dr. John Cumming, who originally placed the end of the *present dispensation* 1866 or 7; but as that time drew near without any millennial symptoms, he was understood to have modified his original views considerably, and came to the belief that the beginning of the M. will not differ so much, after all, from the years immediately preceding it as people commonly suppose. See Corrodi's *Kritische Geschichte des Chiliasmus* (Zurich, 1794, 4 vols.); Calixtus, *De Chiliasmo* (1692, 4to); Klee, *De Chiliasmo* (1825); Schürer's *Neutestamentliche Zeitgeschichte* (1874); and the standard handbooks of the history of Dogma. A really good history of millenarianism, however is as yet a desideratum.

MILLEPEDE, n. *mĭl'lĕ-pēd*, MILLEPEDES, n. plu. *mĭl'-lĕ-pēdz* or *mĭl-lĕp'ĕ-dēz* [L. *millĕ*, a thousand; *pedem*, a foot]: popular name of many kinds of *Myriapoda*, of order *Chilognatha*, and chiefly of families *Julidæ* (see JULUS) and *Polydesmidæ*. In the latter family, the feet are arranged in numerous groups along both sides; otherwise they much resemble the *Julidæ*. The largest species of these articulate animals are found in warm climates, and some are brightly colored; but small species of both families are common in temperate regions, and some, as *Polydesmus complanatus*—which is lilac-colored, flattened, and from a quarter to half an inch in length—are very destructive to roots of plants. Doubt has been expressed if they attack roots perfectly healthy; but, at all events, they take advantage of incipient decay, and greatly extend and accelerate it. The application of salt, lime, nitrate of soda, etc., has been often recommended as preventive of their ravages.—The name PILL MILLEPEDE is often given to those shorter *Chilognatha*, of the family *Glomeridæ*, which, when disturbed, roll themselves up into an almost globular form, like the crustacean called armadillo. *Note.*—The *millepede* has two pairs of limbs to each joint; the *centipede* has but one.

MILLEPORA, n. plu. *mĭl'lĕ-pō'ră*, or MIL'LEPORI'DÆ, n. plu. *-rī'dē*, and MIL'LEPORES, n. plu. *-pōrz* [L. *millĕ*, a thousand; *porus*, a pore]: in *geol.*, genus and family of hydrozoa, contributing largely to the formation of branching corals, whose cells or pores are extremely numerous and minute. MIL'LEPO'RITE, n. *-rīt*, a fossil millepore.—*Millepores* are by recent observers thought to be of two kinds of animals: the larger, gastrozoöids, occupy the larger tubes of the coral skeleton; the smaller, dactylozoöids, occupy the smaller tubes around the larger. The smaller have no mouth, but with their tentacles they catch food for the larger, which have mouth and stomach, and who digest for the whole colony a nutritive fluid which is then distributed to every part by a ramifying system of minute ducts.

MILLER, ALFRED BRASHEAR: American Presbyterian clergyman and educator: b. Brownsville, Pa., 1829, Oct. 16; d. Waynesburg, Pa., 1902, Jan. 20. After obtaining his preparatory education in various schools, he graduated from Waynesburg College in 1853, becoming professor of mathematics there, and remaining in that position until 1858. In 1859 he became president of the college and served as such till 1899 when he became president emeritus. He was for 10 years pastor of the Cumberland Presbyterian church at Waynesburg and also edited the *Cumberland Presbyterian* (1864-8). He published *Doctrines and Genius of the Cumberland Presbyterian Church* (1892).

MILLER, ALFRED JACOB: American painter: b. Baltimore, Md., 1810; d. 1874. He studied under Thomas

Sully, and in Europe, where he made successful copies of the old masters. Accompanying Sir William Drummond Stewart to the Rocky mountains, he painted many striking pictures of the scenery, which are now in Murthley Castle, Scotland. He also executed numerous portraits.

MIL'LER, Anna Jenness: American author and lecturer: b. New Hampshire. She is most widely known as an advocate of correct principles of physical development and dress for women; she is also interested in the æsthetic side of life, and is a student of art and a collector of paintings and curios. She was for many years editor and proprietor of the *Jenness Miller Monthly,* in which she advocated her views; and has given over 1,000 lectures in the United States and Canada on physical culture and dress. She has also designed a costume for women which she claims fulfils the requirements of both hygiene and art. She has published *Barbara Thayer* (1884); *Twixt Love and Law; Mother and Babe* (1892); *How to Finish and Furnish a Home* (1892); *Creating a Home* (1896); *Physical Beauty; Philosopher of Driftwood; Mother's Health and Baby's Welfare* (1905); etc.

MILLER, Charles Henry: American landscape painter: b. New York 1842, Mar. 20. He was educated in medicine at the New York Homœopathic College and subsequently studied art at the Royal Academy of Bavaria in Munich. In 1873 he became an associate of the National Academy of Design and an Academician in 1875. He is especially noted for his studies of Long Island scenery and has exhibited at very many important national and international exhibitions. Among his works may be cited: *Autumn at Creedmoor Oaks; A Gray Day on Long Island; Moonlight Near Great South Bay; Long Island Meadows; A Frosty Day on Long Island; The Springfield Mill Pond.* He has published under the signature of 'Carl de Muldor,' *The Philosophy of Art in America* (1885).

MILLER, Charles Ransom: American journalist: b. Hanover, N. H., 1849, Jan. 17. He was graduated from Dartmouth College in 1872 and became a journalist. In 1872-5 he was with the Springfield *Republican* and since then has been on the staff of the New York *Times,* where he was editorial writer in 1881-3 and is now editor-in-chief.

MILLER, Cincinnatus Heine, better known as 'Joaquin Miller': American poet, whose pseudonym is due to his defense of Joaquin Murietta, a Mexican bandit: b. Wabash district, Ind., 1841, Nov. 10. His father took him to Oregon in 1854. He got a little schooling but soon ran away from home; went to the California gold mines; accompanied Walker on the Nicaragua filibustering expedition; lived familiarly among the Indians and the Spaniards of the Pacific slope; studied law for

a few years, having graduated at Columbia College, Oregon, in 1858; practiced law unsuccessfully in Idaho, where he soon turned express messenger, and in 1863 settled in Oregon for a short time, becoming editor of the Eugene City *Democratic Register*, which was suppressed in the same year because of its treasonable character. In 1864 he began to practice law in Cañon City, Ore., made himself popular by his services against the warlike Snake Indians, and from 1866 to 1870 was judge of Grant co. His writings, collected under the title of *Songs of the Sierras*, he could not sell in the east, and so took them to London, where they were published and brought him great fame. He visited London again in 1873; lived in Washington, D. C.; and in 1887 returned to California, settling near Oakland. His life sums up the adventure of the Pacific slope, and his verse and fiction are to be prized especially on this account as being real 'documents' of certain phases of American life. They are, moreover, fresh, vigorous, and original in style; his metre is free and powerful; and his narrative forcible. He excels, perhaps, in his pictures of Nature. In a few short lyrics there is a quiet melancholy, bred of communion with solitary wood and mountain. But on the whole he is not a great artist, although his work has a distinct value as descriptive of various American types. Hence his fame has been much greater in England, where he was even styled 'the American Byron,' than in America. Miller's works include: *Songs of the Sunlands* (1873); *Songs of the Desert* (1875); *Songs of Italy* (1878); *Collected Poems* (1882); *Songs of Mexican Seas* (1887); *The Baroness of New York* (1877); *The Danites in the Sierras* (1881; later in the form of a play); *'49, or the Gold-Seekers of the Sierras* (1884); *Pacific Palms; Life Among the Modocs; The One Fair Woman; The Destruction of Gotham; Chants for the Boer* (1900); *True Bear Stories* (1900); etc.

MIL'LER, EDWARD, M.D.: 1760, May 9—1812, Mar. 17; b. Dover, Del. He obtained a medical education at the Univ. of Penn. and in a hospital at Basking Ridge, N. J.; served in the revolutionary war as surgeon's mate; went to France 1782 on a war-vessel, and practiced medicine 1783-96 in Dover. In the latter year he removed to New York, where, 1799, he became one of the founders of the *Medical Repository*, the first medical journal published in America. He was appointed New York city physician 1803, medical professor in the University of New York 1807, and clinical lecturer in the New York Hospital 1809. He assisted his brother, the Rev. Samuel Miller, in the preparation of a *Brief Retrospect* published by the latter, and wrote a *Report on the Yellow Fever in New York in 1805*, in which he claimed that the disease is non-contagious, and which still holds a high place in medical literature. He was a strong temperance advocate and earnestly opposed the use of tobacco in any

form. As a practitioner he was one of the most successful of his time. He died at New York. His medical works, edited by his brother, who also furnished a biographical sketch, were published 1814.

MILLER, Emily Huntington: American author and educator: b. Brooklyn, Conn., 1833, Oct. 22. She was graduated from Oberlin College, Ohio, in 1857, and was married to J. E. Miller (d. 1882) in 1860. She was editor of a juvenile magazine, *The Little Corporal*, afterward merged in *St. Nicholas*, and in 1891-8 was dean of the Woman's College of Northwestern University. She has written: *From Avalon and Other Poems* (1896); *Fighting the Enemy; Helps and Hindrances; Songs from the Nest; Captain Fritz; The King's Messengers; Thorn Apples; Highways and Hedges; For the Beloved* (poems); etc.

MILLER, Florence Fenwick: English doctor, lecturer and author: b. 1854, Nov. 5. She entered the Ladies' Medical College, London, in 1871; gained a wide practice and did much charity work; was thrice a member of the London school board; and is a prominent advocate of women's suffrage. She married Frederick A. Ford in 1877, but kept her maiden name. She wrote: *The House of Life* (1879); *Physiology for Schools* (1880); *Atlas of Anatomy* (1880); *Readings in Social Economy* (1883); *Life of Harriet Martineau* (1884); and *In Ladies' Company* (1892), as well as letters over the signature 'Filomena' for the London *News* and for various provincial papers.

MILLER, Harriet Mann ('Olive Thorne Miller'): American ornithological writer: b. Auburn, N. Y., 1831, June 25. Her earliest writings were signed 'Olive Thorne,' and after her marriage to W. T. Miller in 1849 she added her husband's name to her signature. She began her study of birds in 1880 and has published for young people's reading: *Little Folks in Feathers and Fur* (1879); *Little People of Asia* (1882); *In Nesting Time* (1888); *Little Brothers of the Air* (1892); *A Bird-Lover in the West* (1894); *Our Home Pets* (1894); *Four Handed Folk* (1896); *Under the Tree Tops* (1897); *The First Book of Birds* (1899); *The Second Book of Birds* (1901); *True Bird Stories* (1903); *With the Birds in Maine* (1904); *Kristy's Queer Christmas* (1904); *Kristy's Surprise Party* (1905); *Kristy's Rainyday Picnic* (1906); *What Happened to Barbara* (1907); *Harry's Runaway and What Came of It* (1907); etc.

MIL'LER, Henry: 1751, Feb. 12—1824, Apr. 5; b. near Lancaster, Penn. He was admitted to the bar when about 20 years of age, joined the continental army 1775, with a company which he had helped organize and of which he was 1st lieutenant; reached Cambridge July 25, and rendered efficient service. He was promoted captain, was prominent at the battle of Long Island, made major

1777, and the following year lieutenant-colonel. He took part in about 50 battles. He retired from the army 1779, on account of the financial troubles of his family; was high sheriff of York county 1780-83, served in the Pennsylvania legislature 1783-85, and was a member of the state constitutional convention 1790. In 1794, he was appointed quartermaster-general of the expedition against the whisky insurrection. He afterward became a merchant in Baltimore, and in the war of 1812 was commissioned brigadier-general. Returning to Penn., he was prothonotary of Perry county 1821, till he died at Carlisle.

MIL'LER, HENRY, M.D.: 1800, Nov. 1—1874, Feb. 8; b. Lexington, Ky. He was educated at Lexington, where he obtained a license as a physician; practiced medicine a short time in Glasgow, and then removed to Harrodsburg. Here he remained till the opening of the medical university in Louisville, in which, 1835-69, he was professor of obstetrics and the diseases of women and children. In the latter year he was made professor emeritus. He was elected, 1859, president of the American Medical Assoc. His books, *A Treatise on Human Parturition*, 1844, and *The Principles and Practice of Parturition*, 1858, were accepted as standard publications. He contributed many valuable articles to the medical journals of the day. Dr. Miller died at Louisville.

MIL'LER, HUGH: distinguished geologist and writer: 1802, Oct. 10—1856, Dec 23-24; b. Cromarty, in n. Scotland; descended from a family of sailors, and losing his own father by a storm at sea when he was only five years of age. In consequence of this misfortune, he was brought up chiefly under the care of two of his mother's brothers, one of whom ('Uncle Sandy') imbued him with a taste for natural, and the other ('Uncle James') for traditional, history. He acquired good knowledge of English at Cromarty Grammar School. Before his 11th year he had read those romances of childhood, *Jack the Giant-killer, Jack and the Bean-stalk, Sindbad the Sailor, The Yellow Dwarf,* and *Aladdin and the Wonderful Lamp,* besides several works of higher literary pretensions. As he grew older, he became extremely fond of the great English poets and prose writers. From his 17th to his 34th year, he worked as a common stonemason, devoting his leisure hours, chiefly in the winter months, to independent researches in natural history, to the extension of his literary knowledge, and to writing, for which he had a passion. In 1829, he published a volume, *Poems written in the Leisure Hours of a Journeyman Mason,* followed after a few years by *Scenes and Legends of the North of Scotland.* Miller soon decided that poetry was not his field. His attention was soon drawn to the ecclesiastical controversies which were agitating Scotland, and his famous *Letter to Lord Brougham,* on the 'Auchterarder Case,' brought him into public no-

tice. In 1840, he went to Edinburgh as editor of the *Witness*, a newspaper started in the interest of the non-intrusion party in the Church of Scotland; and, in the course of the same year, published in its columns a series of geological articles, afterward collected under the title of *The Old Red Sandstone, or New Walks in an Old Field.* These articles were very remarkable, both in a scientific and literary view. They contained a minute account of the author's discovery of fossils in a formation believed, until then, to be destitute of them, and written in a style which was a rare and harmonious combination of strength, beauty. and polish. At the meeting of the British Assoc. in the same year (1840), he was warmly praised by Murchison and Buckland; indeed, his discoveries were the principal topic of discussion among the savants. His editorial labors during the heat of the Disruption struggle were immense, and so seriously injured his health that for some time he had to give up literary activity. About 1846 he resumed his pen, and became the most vigorous and eloquent writer in the service of the newly constituted Free Church. After ten years of hard, fagging toil, his brain gave way, and, in a moment of aberration, he put an end, by a pistol-shot, to his own existence, at Portobello, near Edinburgh. Miller's principal works, besides those above mentioned, are: *First Impressions of England and its People; Footprints of the Creator, or the Asterolepis of Stromness*, designed as a reply to the *Vestiges of the Natural History of Creation; My Schools and Schoolmasters, or the Story of my Education* (greatly admired); and *Testimony of the Rocks*, an attempt to reconcile the geology of the Pentateuch with the geology of nature, by the hypothesis that the days mentioned in the first chapter of Genesis represent not the actual duration of the successive periods of creation, but only the time occupied by the unrolling of a directly inspired panoramic vision of these periods before the eyes of Moses.

Miller's services to science were great, but he is even more distinguished as a man of genius and as one of the best writers of his time. Of *The Old Red Sandstone*, Buckland said that 'he would give his left hand to possess such powers of description as this man.' As a man, he was honest, high-minded, earnest, and hugely industrious, a true Scot, a hearty but not a sour Presbyterian (for he loved Burns as much as he revered Knox). Scotland may well be proud of 'the stone-mason of Cromarty.' Besides his autobiography quoted above, see Life by Peter Bayne (2 vols. 1871).

MIL'LER, James: 1776, Apr. 25—1851, July 7; b. Peterborough, N. H. He obtained a legal education, became major in the U. S. army 1808, and lieutenant-colonel 1810. He was made brevet-colonel for gallant service as commander at the battle of Brownstown; was prominent in the battles of Fort George, Chippewa, and

Lundy's Lane, by a brilliant assault deciding the latter conflict in favor of the Americans. As a recognition of his services in the war of 1812, he was breveted brigadier-general, and was presented with a gold medal by congress. He was governor of the territory of Arkansas 1819-25, and from the latter date to 1849 was collector of the port of Salem, Mass. He died at Temple, N. H.

MILLER, James Russell, D.D.: American Presbyterian clergyman and author: b. Harshaville, Pa., 1840, Mar. 20. He was graduated from Westminster College, New Wilmington, Pa., in 1862, and has held several important pastorates. He is editor of the Presbyterian Board of Publication, and among his very numerous books are: *Week-Day Religion* (1880); *The Marriage Altar* (1888); *Building of Character* (1894); *To-day and To-morrow* (1902); *In Perfect Peace* (1902); *The Lesson of Love* (1903); *The Face of the Master* (1903); *Our New Edens* (1904); *The Inner Life* (1904); *Beauty of Kindness* (1905); *When the Song Begins* (1905); *The Best Things* (1907); *Glimpses of the Heavenly Life* (1907); *Morning Thoughts for Every Day in the Year* (1907); etc.

MIL'LER, Joaquin. See Miller, Cincinnatus Heine.

MIL'LER, John Franklin: 1831, Nov. 21—1886, Mar. 8; b. South Bend, Ind. He studied law, and from 1855 practiced in South Bend, and entered politics. He resigned 1861 the position of state senator, entered the Union army, organized a regiment, was repeatedly promoted for gallant service, and became brevet major-general of volunteers 1865. He was collector of the port of San Francisco, organized the Alaska commercial fur company, served three times as republican presidential elector, was member 1879 of the Cal. constitutional convention, and from 1881 till his death was a prominent member of the U. S. senate. He died in Washington.

MIL'LER, Joseph: jester: known as Joe Miller (q.v.).

MILLER, Joseph Nelson: American naval officer: b. Ohio, 1836, Nov. 22. He entered the navy in 1851, and at the time of the outbreak of the civil war held the rank of lieutenant, and was promoted lieutenant commander in 1862. As executive officer of the Passaic he had part in the attack upon Fort McAllister and Fort Sumter, and in the two attacks upon Fort Fisher as executive officer of the Monadnock; and received commendation from his commanding officers for bravery and skill in these engagements. In 1870, he was promoted to the rank of commander, and in 1875 was assigned to the Tuscarora, and had charge of the deep sea soundings between the Hawaiian and the Fiji Islands. He obtained the rank of captain in 1881, commodore in 1894, and rear-admiral in 1897. In the latter year as commander-in-chief of the Pacific stations he hoisted the American flag at Honolulu, and in 1898 again raised the flag there, when American

sovereignty of Hawaii was established. In 1897, he was the representative of the United States navy at Queen Victoria's jubilee, with the Brooklyn as flagship; and during the Spanish war (1898) he organized the naval reserves on the Pacific coast. He was retired from active service in 1898, Nov.

MILLER, LEWIS: American inventor and philanthropist: b. Greentown, Ohio, 1829; d. New York, 1899, Feb. 17. He was a machinist, settled at Canton, Ohio, where he made agricultural tools, many of them after his own designs, notably the first successful reapers and binders; and later had factories at Akron and Mansfield. In Akron he built a model Sunday school, and he gave much money for Sunday-school work throughout the country. He planned the Chautauqua Assembly and was its president from 1874 until his death.

MILLER, MERRILL: American naval officer: b. Bellefontaine, Ohio, 1842, Sep. 13. He was appointed to the United States Naval Academy in 1859 and upon the outbreak of the civil war was assigned to active duty. He was in the Mississippi squadron in 1862-3, was at the battles of Arkansas Post, Haines' Bluff, the siege of Vicksburg, and in 1864-5 was with the North Atlantic squadron. He continued in the navy after the war in different stations, was promoted captain in 1893 and rear-admiral 1900, July 1; was in command of United States receiving-ship Vermont 1897-1900; commandant at the Mare Island Navy Yard 1900-3, and of the Pacific naval district 1903-4; and was retired 1904, Sep. 13.

MIL'LER, SAMUEL, D.D.: 1769, Oct. 31—1850, Jan. 7; b. Dover, Del. After graduating from the Univ. of Penn. 1789, he studied theology, received a license to preach 1791, and became, 1793, a colleague of Drs. Rodgers and McKnight in the pastorate of the 1st Presb. Church in New York. He was professor of ecclesiastical history 1813-49 in the Princeton Theol. Seminary. He was one of the leading men in his denomination, a prolific author, an uncompromising Calvinist, and was prominent in the discussions which preceded the division of the Presb. Church into the old and new schools. Although much of his writing was controversial, he was uniformly kind and courteous. Among his published works were *A Brief Retrospect*, in the preparation of which he was assisted by his brother, EDWARD MILLER (q.v.); *Letters on Unitarianism*, *Letters on Clerical Manners and Habits*, *Letters to Presbyterians*, and the *Life of Jonathan Edwards*, in Sparks's *American Biography*. He died at Princeton.

MIL'LER, SAMUEL FREEMAN: b. Richmond, Ky., 1816, Apr. 5; d. Washington, 1890, Oct. 13. He studied medicine at Transylvania Univ.; practiced eight years, studied law, and on account of his anti-slavery sentiments removed to Iowa 1850, where he gained high rank as a lawyer; was an active republican, but declined various

public offices. He was appointed, 1862, by President Lincoln, associate-justice of the supreme court of the United States, and was for many years the senior justice in service. He delivered the oration, Philadelphia 1887, at the centennial celebration of the adoption of the national constitution.

MIL'LER, WARNER: b. Hannibal, Oswego county, N. Y., 1838, Aug. 12. He graduated from Union College 1860, taught in Fort Edward Collegiate Institute, enlisted as a private in the Union army 1861, was taken prisoner at the battle of Winchester, paroled, and in a short time honorably discharged. He visited Europe, and on his return engaged in the manufacture of paper in Herkimer, N. Y. He was a delegate to the republican national convention 1872, member of the state assembly 1874-78, and of the lower house of congress 1878-81. In the latter year he succeeded Thomas C. Platt, who had resigned, in the senate, and served till the expiration of the term, 1887. He was defeated 1888 as republican candidate for governor of N. Y., and was elected president of the Nicaragua Canal Construction Co. 1890, Mar. 6.

MIL'LER, WILLIAM: 1782, Feb. 5—1849, Dec. 20; b. Pittsfield, Mass.; founder of the religious sect known as 'Adventists,' formerly 'Millerites.' His education was limited, but he became a successful farmer and held the offices of justice of the peace, constable, and sheriff, and was captain of volunteers in the war of 1812. He accepted infidel doctrines, but soon renounced them, became a Baptist, and engaged in a close study of the Bible, with no aid except a concordance. After some years he announced that he had found a key to the prophecies, and, about 1833, he began to lecture on the second coming of Christ, which he asserted would occur within one year from 1843, Mar. 21. He obtained a license to preach, but was never ordained. Some 50,000 people accepted his doctrines. The failure of fulfilment of his prophecy was charged to an error in computation, and he continued to look for the speedy coming of the Lord. He called a convention 1845, Apr. 25, at which his followers took the name Adventists (q.v.). He died at Low Hampton, N. Y.

MILLERITE, n. *mĭl'ĕr-īt* [after Professor *Miller*, of Cambridge]: a mineral, sulphate of nickel, occurring in delicate six-sided prisms of a bronze yellow.

MIL'LERITES: peculiar millenarian sect. See MILLER, WILLIAM (1782-1849); also SEVENTH-DAY ADVENTISTS.

MIL'LER'S THUMB. See BULLHEAD.

MILLESIMAL, a. *mĭl-lĕs'ĭ-măl* [L. *millesĭmus*, the thousandth—from *millĕ*, a thousand]: consisting of thousandth parts. MILLES'IMALLY, ad. *-lĭ*.

MILLET, n. *mĭl'lĕt* [F. *millet* or *mil*—from L. *milĭum*: millet]: grain-bearing plant, consisting of a jointed stem having a large head containing abundance of small edible

grains; of species of *Panicum, Setaria,* and allied genera. The genus *Panicum* contains many species, natives of tropical and warm temperate countries, and some of which, as *Guinea Grass* (q.v.), are among the largest fodder grasses. The flowers are in spikes, racemes, or panicles; the glumes very unequal, one of them often very minute; each spikelet containing two florets, one of which is often barren. The genus *Setaria* has a spike-like panicle, with two or more bristles under the glumes of each spikelet.—COMMON MILLET (*Panicum miliaceum*) is an annual grass, three or four ft. high, remarkably covered with long hairs, which stand out at right angles. It has a much-branched nodding panicle; the spikelets are oval, and contain only one seed. It is a native of the E. Indies, but is extensively cultivated in the warmer parts of Europe and other quarters of the world. It succeeds only in those climates in which wine can be produced. It is called, in India, *Warree, Cheena,* and *Kadi-kane.* The grain, which is very nutritious, is only about one-eighth of an inch in length. It is used in the form of groats, or in flour mixed with wheat-flour, which makes a good kind of bread; but bread made of millet alone is brittle and full of cracks. Poultry are extremely fond of millet. The straw is used for feeding cattle.—Other species, *P. miliare, P. frumentaceum,* and *P. pilosum,* are cultivated in different parts of India, chiefly on light and rather dry soils, yielding very abundant crops.—GERMAN MILLET, or MOHAR (*Setaria Germanica*), and ITALIAN MILLET (*S. Italica*), regarded by many as varieties of one species, and probably originally from the East, though now naturalized in s. Europe, are cultivated in many warmer parts of Europe, in India, and other countries. Italian millet is three or four ft. in height: German millet is much dwarfer, and its spike comparatively short, compact, and erect; and less valuable as a grain-plant. The grains of both are very small, only about half as long as that of Common millet; but they are extremely prolific, one root producing many stalks, and one spike of Italian millet often yielding two ounces of grain. The produce is estimated as five times that of wheat. Italian millet is called, in India, *Koongoonie, Kalakangnee,* and *Korakang.* The grain of these millets is exported for feeding cage-birds, and for use as a light and pleasant food, though for this purpose it is little used in Britain and the United States, while it is extensively used in soups, etc., in s. Europe. It does not make good bread. To the same tribe of grasses belong the genera *Paspalum, Pennisetum, Penicillaria, Digitaria,* and *Milium*—species of which are cultivated in different parts of the world for their grain. *Paspalum exile* is the *Fundi* (q.v.) of Africa; and *P. scrobiculatum* is the *Koda* of India, where it is cultivated chiefly on poor soils. *Penicillaria spicata,* or *Pennisetum typhoideum,* is extensively cultivated in Africa and to a considerable extent in India. Its cultiva-

tion has been introduced into s. Europe. It thrives best on light soils. Its Indian name is *Bajree.* It often receives the names EGYPTIAN MILLET and GUINEA CORN (q.v.). It has a somewhat spiked cylindrical panicle.—*Pennisetum distichum* abounds in central Africa, on the s. borders of the Great Desert, where it is called *Uzak,* and is described by Barth as causing much inconvenience to the traveller, the little bristles which are attached to its seeds making them stick like burs to the clothes; they also pierce the skin and cause sores, so that it is necessary to be provided with small pincers for their extraction, and none even of the wild roving natives is ever without such an instrument. But its seed is a common and pleasant article of food, in some places the principal food of the people, and a pleasant beverage is made from it.—*Digitaria sanguinalis* is called POLISH MILLET, being cultivated in cottage-gardens in Poland, where the grain is used like rice. It is a common grass in many parts of Europe, though very rare in Britain. The spikes in this genus are compound, and from their appearance give it the names *Digitaria* and *Finger-grass.*—The MILLET GRASS (*Milium effusum*) of Britain, occasionally found in shady woods, is a very beautiful grass, 3 or 4 ft. high, with a spreading pale panicle of small flowers; and has been much recommended for cultivation as a forage grass, and for its very abundant small seeds, excellent food for game. Another species of the same genus (*M. nigricans*) is the *Maize de Guinea* of Peru, where its seeds, after being dried by heat, are converted into a very white flour, a pleasant article of food; and a beverage called *ullpu* is made from them.—The name INDIAN MILLET is sometimes given to *Durra* (q.v.), but it belongs to a different tribe of grasses from the true millets.

MILLET, *me-yā',* AIMÉ: sculptor: b. Paris, 1816; d. there, 1891, Jan. 14. He studied painting under his father, and sculpture under David d'Angers. He began to exhibit 1842, and 1857 became famous by his *Ariadne,* which the French govt. bought for the museum of the Luxembourg. His statue of *Mercury,* exhibited 1859, and placed in the court of the Louvre; *Vercingetorix,* a colossal figure in bronze; *Apollo,* which crowns the grand opera-house in Paris; his work on the tomb of Henry Murger; his monument to Baudin in Père la Chaise, and statue for Léon Dupré's monument to the guards of the dept. of Eure who fell in the war of 1870-1, are his chief works. Great knowledge of the human figure, and skill in molding it, are shown in all his productions.

MILLET, *mīl'ėt,* FRANCIS DAVIS: painter: b. Mattapoisett, Mass., 1846, Nov. 3. He graduated at Harvard 1869, studied art at Antwerp, gained honors there 1872-3, painted in Belgium, Italy, England, France, and Austria, and settled in New York. He served as art juror in the Vienna world's fair 1873; and during the Turko-Russian

war, 1877-8, was correspondent of the London *Daily News*. At the Paris exposition, 1878, he was a fine-arts juror. He gained a medal at New Orleans 1885, and a prize of $2,000 from the Amer. Art Assoc. 1886. His paintings include landscapes, figures, and portraits, and his literary work a translation of Tolstoi's *Sebastopol*, 1887.

MILLET, *mē-yā'*, JEAN FRANÇOIS: French painter: 1814, Oct. 4—1875, Jan. 20; b. Gréville (Manche). He studied under Mouchel and Langlois at Cherbourg, and Delaroche in Paris; began exhibiting 1844, and till 1848 executed pictures marked by rough vigor; but from 1849 his style changed, and he became a painter of pastoral pieces of great refinement in thought and execution. A peasant himself in origin, his representations of lowly and simple peasant life were wonderfully natural and touching; and in his limning of the fields, with scenes of labor or of animal life, he rose to the highest distinction as a landscape and figure painter. The pictures of his first style were *Milkmaid, Lesson in Riding, Œdipus,* and *Jews at Babylon.* In 1849, he began, in the style of his best work, with *The Sower,* and in the ten years following produced *Country Woman Seated, Men Binding Wheat, Shepherds, Harvesters, Clipping Sheep, Grafter* (which brought at a sale [1881] 133,000 francs), *Gleaners, Angelus, Death and the Woodcutter,* and *Woman with a Cow.* A score of other important works were brought out 1860-70, and after Millet's death 56 pictures and studies, many unfinished, remained in his studio, and were sold for 321,034 francs. The popularity of his pictures has caused them to be extensively engraved and widely dispersed; and a large number of the originals are owned in the United States. The *Angelus* was sold in Paris 1889, and brought $110,000. It was brought to America, and was exhibited to admiring crowds in New York, Chicago, and other places. Millet gained second-class medals 1853 and 64, and first-class 1867. He was elected to the Legion of Honor 1868. He died at Barbizon (Seine-et-Marne).

MILLI, prefix, *mĭl-lĭ* [L. *millĕ,* a thousand]: a thousandfold.

MILLIARD, n. *mĭl-yârd'* [F. *milliard*—from L. *millĕ,* a thousand]: a thousand millions.

MILLIGAN DECISION, THE: an important ruling of the United States Supreme Court in 1866. In 1864, an Indiana man named Milligan was arrested by a United States officer on charges of conspiracy, inciting insurrection, and giving aid to the enemy. He was tried by a military commission, found guilty, and sentenced to be hanged. His counsel filed in the circuit court a petition for a writ of habeas corpus, claiming that the plaintiff was a civilian in no way connected with the military service, and that he was not in a rebel state. The case

was carried to the supreme court, where it was held that a military commission organized during the war in a state not invaded or in rebellion, and where the federal courts were open and unobstructed, had no jurisdiction to try, convict or sentence for a criminal offense a citizen who was neither a resident of a state in rebellion nor a prisoner of war.

MILLIGRAMME, n. *mĭl'lĭ-grăm* [F.—from L. *millĕ*, a thousand: Gr. *gramma*, a letter of the alphabet, a figure]: in the *metric system*, the thousandth part of a Grain (q.v.).

MILLIKEN'S BEND, Engagement at: Milliken's Bend, La., on the west bank of the Mississippi, about 15 miles above Vicksburg, was the base of some of the military operations against that place and the lower Mississippi. Early in 1863, June, when Grant was besieging Vicksburg from the east, Gen. E. Kirby Smith, commanding the Confederate department of the Trans-Mississippi, sent Gen. J. G. Walker's division of 4,000 men to seize the place and other points on the river, and open communication with General Pemberton, in Vicksburg, with the object of furnishing him supplies, or, failing in that, to cover his escape across the river. Walker moved to Alexandria, La., and reported to Gen. R. Taylor, commanding in West Louisiana, and was sent in transports up the Washita and Tensas rivers, until abreast of Vicksburg, when he landed and marched across to Richmond. At this time Milliken's Bend was held by Gen. E. S. Dennis, with about 1,400 men, mostly colored troops. A reconnoitering party sent out by Dennis was driven back by the Confederates. Walker arrived at Richmond at 10 A.M. of the 6th, and was ordered by Taylor to send one brigade to Young's Point and one to Milliken's Bend, distant respectively 20 and 10 miles, and to hold a third brigade in reserve six miles in advance of Richmond. Harris' brigade moved at night on Young's Point, was delayed, and accomplished nothing. Gen. H. E. McCulloch, with a Texas brigade of 1,600 men and 200 cavalry, marched from Richmond at 6 P.M. of the 6th, and at 3 A.M. of the 7th, when, within one and a half miles of Milliken's Bend, the Union skirmishers were encountered and the Confederate advance driven back in some disorder; but McCulloch rallied his men and pushed on, driving the Union troops back slowly to their main line, carrying the Union breastworks and driving the Union troops back to the bank of the river, where two gunboats came to their assistance and, pouring shells into the ranks of the Confederates, obliged them to withdraw and return to Richmond. The Union loss was 127 killed, 287 wounded, and 266 missing; the Confederates lost 44 killed, 131 wounded, and 10 missing.

MILLIKIN, James: American banker and philanthropist: b. Pennsylvania, 1830, Aug. 2. He went to Illinois

as a young man, and in 1860 engaged in banking, later founding the firm of Millikin & Company at Decatur, now the Millikin National Bank, of which he is the president. He is also president of the Union Works. Mr. Millikin has long been known for his philanthropic and benevolent enterprises; for his generous liberality to charities and churches, irrespective of denominations, and for his ready recognition of able and deserving young men, to many of whom he has given valuable assistance in accumulating wealth. He founded the Anna B. Millikin Home, an institution for the care of aged women and children, built and supported mostly by him, and named by the board of directors after his wife, Anna B. Millikin. He founded also the James Millikin University, dedicated in 1904 by President Roosevelt.

MILLILITRE, n. *mĭl'lĭ-lē'tr* [F.—from L. *millĕ*, a thousand; F. *litre*, a unit of measure]: the one-thousandth of a Litre (q.v.).

MILLIMETRE, n. *mĭl'lĭ-mā'tr* or *-mĕt'r* [F.—from L. *millĕ*, a thousand; Gr. *metron*, a measure]: a French linear measure containing the thousandth part of a Mètre (q.v.).

MILLINER, n. *mĭl'ĭn-ẽr* [supposed to be from *Milan*, a town in Italy—that is, a dealer in Milan wares]: one who makes and sells bonnets, head-dresses, etc., for females. MIL'LINERY, n. *-ẽr-ĭ*, bonnets, caps, etc., worn by females; the materials composing them; the business. *Note.*—A *milliner* was formerly of the male sex, and was a dealer in such miscellaneous articles as were imported from Milan. From the fact that formerly a *milliner* was a haberdasher and seller of miscellaneous small-wares, its possible origin from L. *millĕ*, a thousand, is suggested. See SKEAT.

MILLION, n. *mĭl'yŭn* [F. *million;* Sp. *millon;* It. *milione*, a million—from L. *millĕ*, a thousand]: ten hundred thousand—in figures, extending to seven places, as 1,000,000; a very great number. MILLIONTH, a. *mĭl'yŭnth*, the ten-hundred-thousandth; constituting one of a million. MILLIONAIRE, n. *mĭl'yŭn-ãr'* [F. *millionnaire*]: a man worth a million of money; a very rich man. MIL'LIONARY, a. *-ẽr-ĭ*, pertaining to or consisting of millions. MILLIONED, a. *mĭl'yŭnd*, multiplied by millions. THE MILLION, the great body of the people; the public, as distinguished from a select class.

MIL'LIS, JOHN: American military engineer: b. Wheatland, Mich., 1858, Dec. 31. He was graduated from West Point in 1881 and served in the engineering corps until 1883, after which he performed various engineering duties under the government, and in 1894-8 was chief-engineer of the United States Lighthouse Board at Washington. In 1898-1900, he was on duty with the engineers' battalion at Willet's Point, N. Y., and in Cuba. He was sent as delegate to various engineering conferences in

Paris in 1900, and visited Egypt on inspecting duty. From 1900-5 he was on duty at Puget Sound, engaged in river and harbor improvements and fortifications, and since 1905 has been in charge of fortification construction in the Philippine Islands.

MILLS, Albert Leopold: American military officer: b. New York city, 1854, May 7. He was graduated from West Point in 1879 and was commissioned in the cavalry. He served in several campaigns against the Indians and in 1894-8 was instructor in the United States military school at Fort Leavenworth, Kan. Upon the opening of the war with Spain he was ordered to the front, where he rendered distinguished service at the battles of Las Guasimas and Santiago and was brevetted major and lieutenant-colonel. From 1898-1906 he was superintendent at West Point, with the rank of colonel and regimental captain; and, since 1907, Jan. 16, has been commander of the department of the Visayas.

MILLS, Benjamin Fay, A.M., D.D.: American Unitarian clergyman: b. Rahway, N. J., 1857, June 4. He was graduated from Lake Forest University (Ill.) in 1879, was ordained to the Congregational ministry in 1878, held a pastorate at Rutland, Vt., was a prominent evangelist in 1886-97. In 1897, he withdrew from the Congregational denomination owing to his liberal views, and in 1897-9 conducted independent religious meetings in Boston. From 1899-1903 he was pastor of the First Unitarian Church at Oakland, Cal., and in 1904 founded a new religious organization, the Los Angeles Fellowship. Among his books are: *Power from on High* (1889); *Victory through Surrender* (1892); *God's World* (1893); *Twentieth Century Religion* (1899); *The Divine Adventure* (1905); etc.

MILLS, Clark: American sculptor: b. Onondaga county, 1815, Dec. 1; d. Washington, D. C., 1883, Jan. 12. He went South, learned the millwright's trade, worked at New Orleans, and later at Charleston, where he was employed by a plasterer, and discovered a method for taking a cast from the living face which enabled him to make plaster busts cheaply. In 1845, he completed a bust in marble of Calhoun, which was placed in the Charleston city hall in 1846. In 1848, he was appointed by the government to execute an equestrian statue of Andrew Jackson. This was the first large statue cast in metal in the United States. Mills was obliged to learn casting, since there was then no foundry in the country adequate to the work, and when the statue was at last completed it was at a loss to himself of $7,000. This was later repaid to him by congress in an appropriation of $20,000 for a replica at New Orleans. His colossal equestrian statue of Washington, depicting the general at the battle of Princeton, was unveiled at Washington 1860, Feb. 22. He also cast from designs by Thomas Crawford

the statue of *Freedom*, which was placed surmounting the dome of the capitol in 1863, and took a life-mask of President Lincoln shortly before the latter's death.

MILLS, Darius Ogden: American banker and capitalist: b. North Salem, Westchester county, N. Y., 1825, Sep. 25. He was educated in the North Salem Academy and the Mount Pleasant Academy, Sing Sing, N. Y., later becoming cashier of the Merchants Bank of Erie County, Buffalo, N. Y. In 1849, he went to California, where he founded the banking house of D. O. Mills & Co.; from 1864-7 was president of the Bank of California, San Francisco, and after the failure of the institution again taking charge of it until 1878. Since 1880 he has been largely interested in New York real estate; is also prominent in philanthropic enterprises, the Mills hotels being the most noted examples of his generosity.

MILLS, David: Canadian jurist: b. Oxford, Ontario, 1831, Mar. 18. He was educated at the University of Michigan and entered early upon a public life. He served in the Dominion house of commons 1867-96 and was editor of the *Canada Daily Advertiser*, London, Ont., 1882-7. In 1876-8, he was minister of the interior and was minister of justice 1897-1901, since when he has been justice of the supreme court of Canada. He has contributed to the magazines many articles on public questions and has published *The English in Africa* (1900).

MILLS, Job Smith: American United Brethren bishop: b. near Portsmouth, Ohio, 1848, Feb. 28. He was graduated from the Illinois Wesleyan University and studied for the ministry. In 1874-80, 1885-7, he was pastor of Otterbein University, Watertown, Ohio, and in 1887-93 was professor in various branches and then president of Western College, Toledo. He was made bishop in 1893 and has since visited the principal universities of Europe. He has written: *Mission Work in West Africa* (1898); *Holiness* (1902); etc.

MILLS, Lawrence Heyworth: American philologist: b. New York, 1837. He was graduated at New York University in 1857, and at Fairfax Episcopal Theological Seminary, Va.; and entered the Episcopal ministry in 1861. He was stationed in Brooklyn for six years; retired from the ministry in 1867; studied Gnosticism and the Avesta in Europe 1872-87; and in the last named year, having established his reputation as an authority on the Zend-Avesta, went on Max Müller's invitation to Oxford, where he became professor of Zend philology in 1898. He contributed largely to Oriental journals various papers on the Gâthâs and early Zoroastrianism; translated *Zend-Avesta* (Part III. in *Sacred Books of the East*, 1887); and wrote: *Study of the Five Zarathustrian Gâthâs* (1894); *Gâthâs of Zarathustra in Metre and Rhythm* (1900); *Dictionary of the Gathic Language of*

the Zend-Avesta (1902); and *Zoroaster, Philo, and Israel* (1903).

MILLS, Robert: American architect and engineer: b. Charleston, S. C., 1781; d. Washington, D. C., 1855, Mar. He was a pupil of the architect Benjamin Latrobe, and besides designing important structures in Philadelphia, including the single-arch bridge across the Schuylkill, erected custom-houses and marine hospitals in various parts of the United States and the Washington Monument in Baltimore. In 1837, he was appointed architect of the general government at Washington, where he built the Treasury, General Post-Office, and Patent Office, and designed the Washington Monument. He published: *Statistics of South Carolina* (1826); *American Pharos, or Lighthouse Guide* (1832); etc.

MILLS, Roger Quarles: American lawyer and politician: b. Todd county, Ky., 1832, Mar. 30. He moved to Texas in 1849, and studied law; was admitted to the bar at 20, the Texan legislature removing the disability of minority; and began practice at Corsicana. In 1859, he was elected to the Texas legislature. On the outbreak of the civil war he joined the Confederate service, and fought throughout the war. In 1872, he was elected to congress as a democrat, serving till 1892; he was chairman of the house committee on ways and means, and drafted the Mills tariff bill, which, however, failed to become a law. In 1892, he was elected to the senate to fill an unexpired term, and in 1893 was re-elected for the full term of six years.

MILLS, Samuel John: American Congregational clergyman: b. Torringford, Conn., 1783, Apr. 21; d. at sea, 1818, June 16. He was graduated from Williams College in 1809, where he had as an undergraduate organized the first society of foreign missionaries in America, and he afterward studied at Yale and at Andover Seminary. In 1810, he founded the American Board of Commissioners for Foreign Missions. He was licensed to preach in 1812 and at once went on a missionary tour through the southern states, and made a second tour in 1814, succeeding in organizing various religious societies. He was ordained to the ministry in 1815 and in 1817 was sent to Africa to select a site for a colony. He died on the way home.

MILLS, Walter Thomas, A.B., A.M.: American Socialist lecturer: b. Duane, N. Y., 1856, May 11. He was graduated from Wooster University in 1885. He was one of the editors of the *New Voice* (1885-7); and editor of the *Statesman Magazine*, Chicago (1887-90). He was the first delegate sent by the American Federation of Labor to the British Trades Congress in 1892; and was general chairman on Labor Congresses for the World's Fair at Chicago. In 1893-1900, he was engaged in trying to establish a self-supporting farm scheme; in 1900, he

allied himself with the Socialist party, and established the International School of Social Economy, of which he has been principal. This school has 4,000 correspondence students, and held four sessions of special training school courses. He has written *Science of Politics* (1887); *Social Economy* (1903); *The Struggle for Existence* (1904); etc.

MILLS BILL. See TARIFF.

MILLS COLLEGE: at Mills College (P. O.) in Alameda county, Cal., was founded in 1871 as Mills Seminary for Young Women. It was chartered as a college in 1885. It has preparatory and business departments and a college department, the courses of which lead to the degrees of A.B. and B.L. In 1907, there were connected with the college 35 instructors and 208 students. The property was valued at $410,000, and the endowment was $150,000.

MILLS HOTELS: the philanthropic enterprise of D. O. Mills (q.v.) inaugurated in 1897. These are two hotels situated in the tenement districts of New York city and built and operated for the purpose of housing and feeding the unemployed or small-salaried man. The Bleecker Street Hotel has 1,554 rooms, and the Rivington Street Hotel 600, about 100 of which rent for 30 cents per night and the balance for 20 cents. These bedrooms are all separate, about 7½x6 feet in size, and containing a single iron bedstead, one chair and a closet. There are large reading, writing and smoking rooms, a well stocked library, free shower baths, custom laundry, news-stand, etc., conducted as in other first-class hotels. The restaurant is conducted so as to give good food, nutritious, well cooked, and at a price remarkable for cheapness. The average cost of living in the hotels has been from $3.50 to $4 per week, making them a haven for respectable poor men.

MILLSPAUGH, *mĭlz'pâ*, CHARLES FREDERIC: American botanist: b. Ithaca, N. Y., 1854, June 20. He studied a year at Cornell; was graduated at the New York Homœopathic Medical College in 1881; practised medicine for 10 years; and became botanist of West Virginia University in 1891, professor of medical botany in the Chicago Homœopathic Medical College in 1897, having been curator of the department of botany in the Field Columbian Museum since 1894. He traveled in Mexico, in Brazil, and in the West Indies, and is the author of *American Medical Plants* (1887); *Flora of St. Croix, D. W. I.* (1902); *Plantæ Yucatanæ* (1903); etc.

MILLSPAUGH, FRANK ROSEBROOK, D.D.: American Protestant Episcopal bishop: b. Nichols, N. Y. He was graduated from the Shattuck School, Faribault, Minn., in 1870, and from the Seabury Divinity School there in 1873. He entered the Episcopal ministry in the year last named, served as missionary in Minnesota 1873-6, was subsequently dean of the Omaha (Neb.) Cathedral, rector

of St. Paul's, Minneapolis, and dean of Topeka (Kan.) Cathedral. In 1895, he was consecrated bishop of Kansas.

MILL SPRINGS: Ky., village in Wayne county; on the Cumberland river; about 90 miles south of Frankfort. It has steamer connections with places on the Cumberland and Ohio rivers. A battle was fought here 1862, Jan. 19, between a Federal force of 4,000 men, under Gen. George H. Thomas, and a Confederate force, about the same number, under Gen. George B. Crittenden. The Federals were successful. The names 'Battle of Fishing Creek,' 'Battle of Logan's Cross Roads,' and 'Battle of Mill Springs' are given to this engagement. A national cemetery located here contains 718 graves of soldiers; 366 are of unknown dead.

MILL SPRINGS, Battle of: the opening of the Kentucky-Tennessee campaign of 1862. At the close of 1861 the Confederate line extended from Columbus, Ky., on the Mississippi, through Fort Henry on the Tennessee, Fort Donelson on the Cumberland, Clarksville, Tenn., and Bowling Green, Ky., to Mill Springs on the Cumberland. Gen. A. S. Johnston was in chief command. Gen. D. C. Buell was the opposing Union commander. Gen. F. K. Zollicoffer established the Confederate right at Mill Springs early in December. Gen. Geo. B. Crittenden took general command there at the middle of the month, with the brigades of Zollicoffer and W. H. Carroll under him. Gen. Leonidas Polk held the Confederate left at Columbus, Gen. J. B. Floyd reached Fort Donelson February 13 and had under him Gens. Pillow, Buckner, and Bushrod Johnson. Gen. A. S. Johnston was at Bowling Green, the centre. Gen. Geo. H. Thomas was on the Union left, with Gen. Schoepf immediately opposed to Zollicoffer, while Gen. Buell, with headquarters at Louisville, was in close communication with the Union centre, which threatened Bowling Green and Nashville.

Gen. Zollicoffer having crossed from Mill Springs to the north bank of the Cumberland and intrenched his position, from which he threatened central Kentucky, Gen. Thomas was sent against his forces, now commanded by Gen. Crittenden, from the direction of Lebanon. On January 18, Gen. Thomas reached Logan's Cross Roads about 10 miles from Crittenden's intrenchments. The latter officer, with the purpose of attacking before Thomas could concentrate his forces, marched at midnight of the 18th with Zollicoffer's and Carroll's brigades, consisting of eight regiments of infantry, six guns, and four battalions of cavalry, and attacked Gen. Thomas soon after daylight of January 19.

The Union troops, consisting of six infantry regiments, one battery, and a portion of a cavalry regiment, were brought rapidly into action, both sides fighting with spirit. Finally, when three fresh Union regiments fell on the Confederate right, and the 2d Minnesota was

pouring a galling fire upon the centre, the 9th Ohio (German Turners) made a brilliant bayonet charge completely turning the Confederate left, resulting in the Confederate lines breaking and retiring in confusion. At this point Gen. Schoepf's brigade from Somerset reached the field, and the whole force continued in pursuit, reaching the Confederate intrenchments during the night, and forming to assault them at daylight. During the night the Confederates succeeded in crossing their men, leaving artillery, cavalry, horses, mules, wagons, camp equipage and private baggage. The Confederate right wing was effectually broken and largely dispersed.

The overthrow of the Confederate right was followed February 6 by the capture by Admiral Foote, acting in co-operation with Gen. Grant, of Fort Henry on the Tennessee, and February 16 by the capture of Fort Donelson, with its artillery and garrison of about 15,000, by Gen. Grant.

On February 8, Gen. Johnston notified the secretary of war that the loss of Fort Henry and the movement against Fort Donelson made the Bowling Green line untenable, and that he had directed Gen. Hardee at Bowling Green to prepare to fall back on Nashville. The evacuation was completed February 14, and by the 17th Gen. Hardee had crossed the Cumberland at Nashville and proceeded toward Murfreesboro. Ten days later, all army supplies having been sent to Chattanooga, which place was held by troops sent by Gen. Bragg from Mobile, Johnston's army marched for the line of the Memphis & Charleston railroad at Decatur, this line having been decided upon as the next for defense.

By the last of March, Johnston's column had taken position at Corinth, Bragg's forces had reached him from Mobile, and a portion of Polk's from Columbus.

Meantime (February 15) Bowling Green was occupied by Union forces under O. M. Mitchel. Pressing on, he reached Edgefield opposite Nashville on the 14th. Nelson's division arrived by transports the next day, and soon after the first of March Buell's entire column, coming partly by land and in part by river, was concentrated at Nashville.

The Union movement to Pittsburg Landing began March 10 by the despatch of Gen. W. T. Sherman's division from Paducah up the Tennessee. It proceeded, under orders of Gen. C. F. Smith, to the vicinity of Eastport; but finding all streams inland at flood the expedition dropped back to Pittsburg Landing, where it found Hurlbut's division. The latter took post 1½ miles back February 18, and Sherman's the next day about three miles back, at Shiloh Church. These were followed within a few days by the divisions of Prentiss, McClernand and W. H. H. Wallace, each selecting its own camp without special reference to a general line, the movement being regarded as a concentration preparatory to an advance on Corinth.

Gen. Lew Wallace's division was halted at Crump's Landing, five miles below Pittsburg. Gen. Grant arrived and assumed command March 17, establishing his headquarters at Savannah nine miles below, on the opposite side of the Tennessee.

Gen. Buell's advance left Nashville March 15 to join Gen. Grant at Savannah. After marching 130 miles in nine days he was stopped by high water in Duck river, necessitating bridging, and then marched the remaining 90 miles in six days. Gen. Grant had advised him that it was not necessary to hurry, as he would not be ready to cross his command over the river till April 8. However, Buell pushed on and fortunately reached Savannah with the head of his column the night of the 5th. Gen. Johnston, with the design of attacking Grant before Buell could join him, had marched from Corinth April 3d, with the expectation of attacking on the 5th, but heavy rains delayed his columns, and his unexpected attack was delivered soon after daylight of April 6, thus opening the battle of Shiloh or Pittsburg Landing. See SHILOH, BATTLE OF.

MILL'STONE: one of the two cylindrical stones used to grind grain into flour (q.v.). The best foreign stones are the German basaltic lava quarried near Cologne, and the French burstone; both are imported into the United States in small pieces from which the cylindrical stone is built up. The native stone is commonly used in the single piece; a sandstone found in Ulster county, N. Y., and in Lancaster county, Pa., and a burstone much like the French, are the best materials, being hard and tough and having a cellular structure, which in the burstone is due to the presence of fossil casts. The lower stone is usually fixed; the upper stone is the 'runner.' Each stone is deeply scored with furrows, which lead the milled grist away from the centre; the intervals are styled 'land'; and the hole in the centre is called the 'eye.' A depression about the eye is the 'bosom.' The scheme for scoring the stone varies greatly. The roller process has relegated the millstone to the minor grist mills.

MILL'VALE: Pa., borough, in Allegheny county; on the Allegheny river, and on the Pittsburg & W., the Buffalo, R. & P., and the Pennsylvania railroads; opposite Pittsburg. It is really an industrial suburb of Pittsburg; its chief manufactures are lumber, iron products, saws, dressed stone, and steel products. The government is administered by a burgess, who holds office three years, and a council. The borough owns and operates the electric light plant and the water works. Pop. (1910) 7,861.

MILLVILLE, *mĭl'vĭl:* city, Cumberland county, N. J., on the e. bank of the Maurice river, at the head of navigation. It is on the Pennsylvania railroad, 41 m. s. and e. of Philadelphia, six m. s. of Vineland. It has several churches, good schools, two newspapers, a national bank, and several hotels. Its extensive manufactures include

cotton, lumber, hollow glassware and window-glass, iron pipes for water and gas, and turbine water-wheels. It has a large trade with the agricultural communities by which it is surrounded, and many of its manufactures are sent to distant points. Pop. (1910) 12,451.

MILMAN, *mĭl'man*, HENRY HART, D.D.: English poet and ecclesiastical historian: 1791, Feb. 10—1868, Sep. 24; b. London; youngest son of Sir Francis Milman, physician to George III. He was educated at Eton, and afterward at Brasenose College, Oxford, where he took the degree M.A., and obtained the Newdegate prize 1812. He published *Fazio: A Tragedy* (successfully brought upon the stage at Covent Garden) 1815; took priest's orders 1817; and soon was appointed vicar of St. Mary's, Reading. In the following year appeared his *Samor, Lord of the Bright City: An Heroic Poem*, followed 1820 by the *Fall of Jerusalem*, a beautiful dramatic poem, with some fine sacred lyrics interspersed. In 1821 Milman was chosen professor of poetry at Oxford, and published three other poems in the same year—*The Martyr of Antioch, Belshazzar*, and *Anne Boleyn*. His *Sermons at the Bampton Lecture* appeared 1827, and *History of the Jews* (3 vols.) 1829. The last of these works did not bear the author's name; it was so broadly liberal that ecclesiastics of the stricter sort could hardly fail to be offended. Its weak point was a want of adequate learning, especially in biblical criticism. A new ed., greatly improved, and more critical, yet still far from accurate or solid, with an interesting preface, was published 1863. In 1840 appeared a collected ed. of his *Poetical Works;* also, *History of Christianity from the Birth of Christ to the Abolition of Paganism in the Roman Empire* (3 vols.). In 1849 he was made dean of St. Paul's; and 1854 published his masterpiece, *History of Latin Christianity, including that of the Popes to the Pontificate of Nicholas V.* (3 vols.). It is a work of great learning, liberality, and chastened eloquence; it shows a broad grasp of human nature in its religious workings, besides a philosophic and poetical sympathy with the different men and opinions which it reviews. Milman edited Gibbon and Horace, and contributed extensively to the *Quarterly Review*. His delightful *Annals of St. Paul's Cathedral* were published 1868, and a complete ed. of his *Historical Works* (15 vols.) 1867-8.

MILMORE, *mĭl'mōr*, MARTIN: 1844, Sep. 14—1883, July 21; b. Sligo, Ireland: sculptor. He came to Boston 1851, learned wood-carving from a brother, and graduated 1860 from the Latin School. For some years he was pupil of Thomas Ball. He then opened a studio in Boston, but soon went to Rome to complete his art studies. He produced busts of Sumner, Longfellow, Emerson, and other eminent men. In 1863 he was commissioned to execute a soldiers' and sailors' monument to be placed on Boston Common. The soldiers' monument in

Forest Hill Cemetery, Roxbury, is from his design, as are also similar monuments in various cities. Among his noted works are the granite figures of *Ceres, Flora,* and *Pomona,* in Horticultural Hall, Boston; the *Weeping Lion* at Waterville, Me.; and the statue of *America* at Fitchburg, Mass. A bust of Webster for the state-house at Concord, N. H., was his last work. He died at Boston Highlands.

MILN, Louise Jordan: English journalist and author; b. 1864, March 5. After extensive travel she contributed to various London journals, such as the *Pall Mall Gazette,* the *Morning Post,* the *Times,* and particularly the *British Realm.* Among her publications are: *When We Were Strolling Players in the East* (1894); *Quaint Korea* (1895); *An Actor's Wooing* (1896); *Little Folk of Many Lands* (1899); etc.

MILNE, John: English geologist: b. Liverpool, 1850. After study at the Royal School of Mines, London, he traveled in Iceland, mined in Newfoundland (1873-4), and in 1875 became professor of mining and geology under the Japanese government. He is a recognized authority on seismology, published a volume on *Earthquakes* (*Natural Science* series), and established the Japanese Seismological Society (1886).

MILNE-EDWARDS, *mĭln-ĕd'wardz,* F. *mēl-nā-dwâr',* Henri, M.D.: one of the foremost of recent naturalists: 1800, Oct. 23—1885, July 29; b. Bruges, Belgium. His father was an Englishman. Milne-Edwards studied medicine at Paris, where he took his degree M.D. 1823, but applied himself to nat. history. In 1841 he was appointed prof. of nat. history at the Collége Royal, and afterward to the Faculté des Sciences, of which he became dean, and at the Jardin des Plantes. He was a member of the Académie de Médecine, and of most of the learned academies of Europe and America; and held several orders; among others, since 1861, that of commander of the Legion of Honor. He was among the first zoölogists to make repeated and prolonged visits to the sea-coasts for study of the higher and lower forms alive. He published numerous original memoirs of importance in the *Annales des Sciences Naturelles,* a journal which he assisted in editing for 50 years. His *Eléments de Zoölogie* were issued 1834, and reissued 1851 as *Cours Elémentaire de Zoölogie.* The latter had enormous circulation in his own and other countries, was translated into various languages, and till lately formed the basis of most minor manuals of zoölogy in Europe. His *Histoire Naturelle des Crustacés* (1834-40) was long the standard authority on the crustacea; the *Histoire Naturelle des Coraillaires* (1857-60) was almost equally noteworthy. *Lectures on the Physiology and Comparative Anatomy of Man and the Animals* (14 vols. 1857-81) are of great permanent value for the immense mass of details and copious references to scattered sources of information. He had an

important share in a splendid quarto of *Anatomical and Zoölogical Researches on the Coasts of Sicily*. Other works were researches on the nat. history of the French coasts (1832–45) and on the nat. history of the mammalia (1871). In some later works he was assisted by his distinguished son, Alphonse. M.-E. must always hold high rank among the naturalists of the 19th c. His services were valuable especially in the department of the invertebrates. His researches in the distribution of the lower invertebrates led him to the theory of centres of creation; and to this he adhered throughout life, notwithstanding the general acceptance of the newer views of Darwin by scientists.

MILNER, *mĭl'nĕr*, JOHN, D.D., F.S.A.: 1752, Oct. 14—1826, April 19; b. London: Rom. Cath. controversial writer. He received his education at Edgbaston and Douai, entered the priesthood 1777, two years later had charge of a chapel at Winchester, and 1803 was appointed bp. of Castabala and vicar-apostolic of the Midland district. His *History, Civil and Ecclesiastical, and Survey of the Antiquities of Winchester*, opened a controversy which was long continued, during which he published *Letters to a Prebendary* and *the End of Religious Controversy*, which hold a place as standard works in defense of the Rom. Cath. faith. While holding the office of bishop he took part in political affairs and strongly opposed giving the British government a veto power on the appointment of bishops of the Rom. Cath. Church. He was expelled, 1823, from the bishopric by the English Catholic board, and three years later died at Wolverhampton.

MIL'NER, JOSEPH: ecclesiastical historian: 1744–1797, Nov. 15; b. near Leeds, England. He studied at Cambridge, and afterward became famous as head-master of the grammar school at Hull. He was also lecturer in the principal church of the town, and, 1797, vicar of Holy Trinity Church. M.'s principal work is *History of the Church of Christ*, 4 vols. (3 vols. 1794). His brother, DR. ISAAC M., dean of Carlisle, published a complete ed. of his works, 8 vols., 1810. The principles on which the *History of the Church of Christ* is written are of the narrowest kind: the scholarship, literary style, and critical insight are alike poor.

MILNES, RICHARD MONCKTON: see HOUGHTON, Lord.

MI'LO: Greek island in the Cyclades group: see MELOS.

MILO, *mī'lō*, of Crotona, in Magna Græcia (q.v.): athlete famous throughout the ancient world for his great strength: lived, according to Herodotus, about the end of B.C. 6th c. Among other displays of strength, he is said to have carried a live ox upon his shoulders through the stadium of Olympia, and afterward to have eaten the whole of it in one day; and on another (reversing the story of the Hebrew Samson), to have upheld the pillars of a house in which Pythagoras and his scholars were assembled, so as to give them time to make their escape

when the house was falling. He is said to have lost his life through too great confidence in his own strength, when he was growing old, in attempting to rend asunder a tree, which some wood-choppers had left partially split, with a wedge: the wedge dropped out, and the tree closed upon his hands, holding him fast until he was devoured by wolves. This tradition has been used to point a moral.

MILREI, n., or MILREA, n., or MILREE, n. *mĭl′rē* [Port. *mil reis*, one thousand reis]: a Portuguese silver coin and money of account, value 4*s.* 8½*d.* to 4*s.* 10*d.* (abt. $1.14½ to $1.17½); used also in Brazil, where value, however, is from 2*s.* to 2*s.* 3*d.* only (abt. 48⅔ cents to 54⅔ cents). The coin is commonly known in Portugal as the *coroa*, or 'crown,' and is (since 1835, Apr. 24) the unit of the money-system in that country. The half-coroa, or half-milrei, of 500 reis, also is used in both Portugal and Brazil. The name 'milrei' was used in Portuguese accounts long before any coin representing its value existed.

MILT, n. *mĭlt* [Icel. *milti;* Dan. *milt;* It. *milza*, the spleen: Pol. *mleko*, milk; *melcz*, milt of fish: connected with Eng. *milk*]: the soft whitish substance found in male fish, as the roe is found in female fish; the spleen: V. to impregnate eggs or spawn, as a fish. MILT′ING, imp. MILT′ED, pp. MILT′ER, n. *-ėr*, a male fish.

MILTIADES, *mĭl-tī′a-dēz:* celebrated Athenian general: B.C. 5th c.: 'tyrant of the Chersonese,' yet, as Byron sings, 'freedom's best and bravest friend.' Forced by Darius to flee from his dominions, he took refuge at Athens, and on the second Persian invasion of Greece, his military talents being of a high order, he was chosen one of the ten generals. He distinguished himself particularly by the great victory which he gained at Marathon (q.v.), with a small body of Athenians and 1,000 Platæans (B.C. 490, Sep. 29), over the Persian host, under Datis and Artaphernes. By this victory, the Greeks were emboldened for the heroic struggle which they made in defense of their country and their liberty. M., being intrusted with the command of an armament for the purpose of retaliating on the Persians, made an attack on the island of Paros, to gratify a private enmity; but failing in the attempt, he was, on his return to Athens, condemned to pay a heavy fine as indemnification for the expenses of the expedition. Being unable to do this, he was thrown into prison, where he died of a wound received at Paros. The fine was exacted after his death, from his son, Cimon (q.v.).

MILTON, *mĭl′ton:* town, Norfolk co., Mass., on the Neponset river, 9 m. s. of Boston, with which it has both steam and street railroad connections. It has extensive market-gardens, and manufactories of rubber goods, leather, paper, and chocolate. Quarries of a very fine granite are worked in summer. There are many beautiful drives, and the roads are excellent. Within the limits of M. are the Blue Hills, from which the state of Mass. received its Indian name. Pop. (1910) 7,924.

MILTON.

MIL'TON, JOHN: English poet: 1608, Dec. 9—1674, Nov. 8; b. in Bread Street, Cheapside, London; of an ancient Rom. Cath. family, though his father, becoming a Protestant, had been disinherited. Milton's father followed the occupation of a scrivener, by which legal business, according to Aubrey, 'he got a plentiful estate,' and was a man of great musical accomplishment, being composer, among other things, of the two well-known psalm-tunes *Norwich* and *York*. From him his son derived his matchless ear for melody, and that strict integrity of character for which he is as famous as for his verse.

Milton was carefully nurtured and educated. He was placed first under the care of a private tutor named Young, a Scotchman by birth and education; and at the age of 12 was sent to St. Paul's School, London, and afterward to Christ's College, Cambridge. According to the University Register, he was admitted 1624-5, Feb. 12. At first he was unpopular in the university, and was nicknamed 'the Lady of Christ's College,' partly from the gracefulness of his person, and partly from his fastidious severity of morals—a sort of haughty Puritanism. Before his graduation, however, he won general deference and regard, and a very high repute for scholarship and genius. He took his degree M.A.; and having relinquished the idea of following divinity because he could not bring himself to subscribe to Laud's high prelacy then in vogue, he left Cambridge 1632, and went to live at his father's house at Horton, in Buckinghamshire. There, in serenity of mind, he lived five years, reading the Greek and Latin poets, and composing *Comus*, *Lycidas*, *Arcades*, *L'Allegro*, and *Il Penseroso*. On the death of his mother, 1637, he went abroad, visiting the chief Italian cities, and making the acquaintance of Grotius and Galileo. While travelling, being made aware that clouds were gathering in the political atmosphere at home, he returned in 1639, and occupied himself with the tuition of his nephews—on which portion of Milton's life, Dr. Johnson could not avoid looking with 'some degree of merriment.' In 1641, he engaged in the controversies of the times, and in the course of that and the following year, he issued the treatises *Of Reformation*, the most powerful polemic pamphlet of the time against the prelatical episcopacy which had been retained when the English church had been reformed; *The Reason of Church Government urged against Prelacy; Prelatical Episcopacy;* and *An Apology for Smectymnuus*. In 1643, he married rather suddenly Mary, daughter of Richard Powell, an Oxfordshire royalist, but the union did not at first prove happy. His wife, only 17 years of age, who had been accustomed to 'dance with the king's officers at home,' found her husband's society too austere and philosophic for her gay tastes. After the severe honeymoon was over, she obtained permission to visit her relatives till Michaelmas; but when Michaelmas came, she

refused to return, and from her royalist family came the intimation that he need never expect her return. Stern and proud, Milton repudiated her at once; and the matrimonial disagreement made the world the richer by four *Treatises on Divorce.* A reconciliation, however, took place, which, we have no reason to doubt, was both genuine and permanent. Mary Powell died 1652-3, leaving her husband three daughters, Ann, Mary, and Deborah, of whose undutifulness and ingratitude we have latterly many complaints. In 1644 he produced his *Tractate on Education;* and, as a sort of remonstrance to the Long Parliament against their restriction of the liberty of printing, his famous *Areopagitica*—a flame of eloquence which still gives heat. The pressure of events had led Cromwell to fear the intolerance of the majority of the Long Parliament, who were bent on establishing the Church of England as Presbyterian and suppressing the various kinds of Independents or Congregationalists as sectaries and schismatics. Cromwell, as a believer in congregational independency, did not oppose a Presbyterian establishment, but insisted that such establishment should not be without guaranties of liberty of conscience and universal toleration, at least to all Protestants. The army, now victorious under Cromwell, was full of independent sectaries who echoed this demand for liberty. Milton's whole nature was in sympathy with it, and he plunged eagerly into the contest in its behalf. His theology, though deeply evangelical, was far from strictly Calvinistic, and he was in advance of his times in his cordial trust in the safety of liberty whether in church or state. In his tolerant views of church-order, he agreed with Cromwell, whom he greatly revered, calling him, 'Our Chief of Men.' After the execution of King Charles, he was appointed Latin secretary to the council of state, with a salary of £290, equal now to about $5,000. In his new position, his pen was as terrible as Cromwell's sword. In *Eikonoklastes,* he made a savage but effective reply to the famous *Eikon Basilike;* and in his *Pro Populo Anglicano Defensio* he assailed his opponent, Claude de Saumaire, better known as *Salmasius,* and reputed the greatest scholar in Europe, with such a storm of eloquence and abuse as to hasten the death of the latter, who died at Spa 1653. His second wife, whom he married 1656, Nov. 12, died 1658, Feb.

Unceasing study had affected his eyesight, and about 1654, Milton became totally blind. After the Restoration, he retired from affairs; he was obnoxious to the reigning power, and it is said that he was once in custody of the sergeant-at-arms. On the publication of the Act of Oblivion, he married his third wife, Elizabeth Minshull, and shortly afterward removed to a house in Artillery Walk, where he was busy with *Paradise Lost.* This great poem was planned originally as a mystery; then some idea of treating it as a drama haunted the author's mind; finally,

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however, he resolved to write an epic poem on the Fall of Man. The poem was published 1667. He received five pounds from his publisher, and a promise of other five pounds when 1,300 copies should have been sold. In 1670, he published his *History of England*. Next year, he printed *Paradise Regained* and *Samson Agonistes*. He died, leaving property to the value of £1,500, and was buried next his father, in the chancel of St. Giles, Cripplegate.

M. was, above all English poets, stately and grand. He arrived early at the knowledge of his powers, and did not scruple, in one of his prose tracts, to inform his readers that he purposed to write a poem which would be considered one of the glories of his country. Drawn away for a time by the heats of controversy and by official tasks, he never forgot his pledge, and redeemed it at last in old age, blindness, and neglect. In comparison, other poets are like sailing-ships, at the mercy of the winds of passion and circumstance; he resembled the ocean steamer, which, by dint of internal energy, can pierce through the hurricane. Never, perhaps, was a mind more richly furnished. His careless 'largess' is greater than the fortunes of other men. His *Comus* is the very morning-light of poetry; while in his great epic, *Paradise Lost*, there is a massiveness of thought, a sublimity of imagery, a pomp of sound—as of rolling organs and the outbursting of cathedral choirs—which can be found nowhere else. His great passages echo in the mind as if loath to die. Of all great writers he is perhaps the one for whom we are conscious of the least personal affection, and this arises from a certain hauteur and severity which awes—which repels some natures; yet he infects his reader with his own seriousness. See Pattison's short life (1879); Stern's *M. u. seine Zeit* (1878); and Masson's *Life and Times of M.*, 6 vols. (1858-80).

MILTON, borough in Northumberland co., Pa., on the Susquehanna river and the Pennsylvania canal, and on the Philadelphia & Reading and Philadelphia & Erie division of the Pennsylvania R.R.'s; about 66 miles north of Harrisburg. It was settled in 1768 by Marcus Hulings, and laid out in 1792 by Andrew Straub. It was incorporated as a borough in 1816. Milton is a manufacturing place; the chief industrial establishments are car works, which have 525 employees; iron mills, with 950 employees; machine shops, 175; knitting and spinning mills, 320; bamboo furniture factories, 80; nail mill, 100; and other manufactories employing about 450 persons. The industries are all of home development; the report of the factory inspector shows that Milton has the largest per cent. of population wage earners in the state. There are 11 churches and good public schools. The government is vested in a burgess and a council of 15 members elected for three years. Pop. (1900) 6,175.

MILTON COLLEGE, in Milton, Wis., a coeducational institution, founded in 1844 by the Seventh Day Adventists as Du Lac Academy; in 1848 the name was changed to Milton Academy, and in 1867 it was incorporated as a college. In 1902 there were reported 12 professors and instructors; 141 students; about 10,000 volumes in the library; grounds, buildings, and apparatus valued at $36,000; productive funds, $84,000; total income about $11,500 per year. In 1901 the benefactions were nearly $4,000. The number of graduates was (1905) about 300.

MILWAUKEE, *mĭl-waw'kē:* city, port of entry, county seat of Milwaukee co., Wis.; on Lake Michigan, the Milwaukee river, and the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul, and the Wisconsin Central railways; 82 m. e. of Madison, 85 m. n. of Chicago: area 21 sq. m.

River and Harbor.—The water front is on a curve of the shore inward, which gives the city an excellent bay, 6 m. wide from cape to cape, and 3 m. inward from an imaginary line between the headlands. The Milwaukee river flows through the city, receiving the waters of the Kinnickinnic near its mouth, and of the Menomonee a little farther up. Both of these branches have been improved by costly operations; and the main stream, by means of a dam at the head of deep water, has been given a depth which permits large vessels to move to the docks near the center of the city. The U. S. govt. has constructed a breakwater in the bay at a cost of over $1,000,000, and provided a spacious harbor of refuge for lake shipping.

Plan of the City.—Immediately n. of the harbor the shore rises 80–100 ft. above the lake and makes a beautiful residential section, and on the w. side the elevation is 125–175 ft., the crown being beautified by costly dwellings and furnishing an admirable outlook. For a goodly stretch along the lake the bluff has been transformed into a public park, with terraces down to the beach. The three river water-courses and the canal are crossed by 2 lift, 8 stationary, and 21 swinging bridges, nearly all of iron. Rapid transit was promoted by the Milwaukee Street Railway Co., which owned the entire street railway system of the city, and extensive electric light and power plants; was reorganized after being placed under a receivership; and operated over 145 m. of trolley road.

Public Works.—Some advanced theories in municipal ownership and administration have found a footing. The waterworks property, valued at $5,154,617, is owned by the city, the entire cost of construction and maintenance having been paid out of its proceeds, and its large surplus revenues now aid in defraying other municipal expenditures. A crematory for consuming garbage, which is collected by the health department, is also owned by the city. A free emergency hospital, originally a private benefaction, is maintained at public

expense, likewise three large natatoriums all the year through, and in the summer free public bath houses on the lake beach and swimming schools on the upper Milwaukee river. In many of the public parks, of which there are 21, partly with boulevard connections, free public concerts are given semi-weekly. The total acreage of these parks is 571. Ten of them vary from 20 to 150 acres in extent, the others being small breathing spots distributed in various parts of the city. During six winter months, free public evening lectures for adults are given in public school halls, the expense being borne by the school fund. The city owns exposition grounds, though the building located upon them is the property of a quasi-private corporation. A city hall was completed in 1896 at a cost of $1,200,000, and a library and museum building is valued at $1,168,000, with contents. The library comprises 150,000 volumes. There are 239,291 specimens in the museum, including a remarkable collection of 5,244 different kinds of birds' eggs and nests, and of 2,529 arms and military accoutrements representing all nations and eras. Among the notable public works is a flushing tunnel connecting the Milwaukee river with the lake, water being pumped from the lake into the stream in such quantities as to cleanse the channel whenever required to prevent offensive conditions. A system of intercepting sewers paralleling the streams has been constructed.

Trade and Industries.—Its harbor facilities have made Milwaukee a manufacturing city chiefly. All of the rivers being navigable, and the present channels supplying a dockage of 23.63 miles available to vessels, hundreds of manufacturing establishments are located on the upper reaches of the streams, with slips for additional vessel facilities. The Milwaukee and Menomonee rivers are each provided with turning basins that can be used by the largest lake vessels, and a large turning basin in the Kinnickinnic river, a mile from the harbor entrance, will soon be constructed. The deepest draft vessels can navigate the rivers and canals. The fleets of six independent steamship lines, and a fleet of car-ferries that is operated uninterruptedly all the year, furnish the water transportation to Milwaukee manufacturers. Iron and copper ore and lumber from the Great Lakes districts, and coal from the mines of the middle states are thus transported cheaply. Three great railroad systems and their connections supply rail transportation facilities. According to the U. S. census of 1900 there were 3,342 manufacturing establishments, employing $110,363,854 capital, and 48,328 persons, paying $20,240,656 for wages and $65,118,719 for materials; and yielding products valued at $123,786,449. The principal articles were, foundry and machine shop products, $14,495,362; malt liquors, $13,893,390; leather, $10,267,835; iron and steel, $7,410,213; flouring and grist mill products, $6,357,983; slaughtering and meat packing, $5,980,340; clothing,

men's and women's, $5,483,666; carpentering, $3,324,734; boots and shoes, $2,397,350; malt, $2,317,870; agricultural implements, $2,296,888; bread and other bakery products, $2,157,802; and enameling and enamelled goods, $1,708,171. From 1880 to 1890 the total product of the city's industries increased 147 per cent. During the following decade the increase was 88.6 per cent. The manufacturing statistics for 1902 are as follows: Persons employed, 78,150; paid in wages, $41,434,131; capital employed, $153,202,051; value of products, $230,316,562. The total volume of wholesale business amounted to $326,371,153. The sum of $8,153,180 was expended in new buildings.

Churches.—In 82 of the 162 churches, sermons are preached in foreign languages, including German, Polish, Dutch, Scandinavian, Welsh, Bohemian, Russian and Italian. The seat of a Catholic archbishopric and of a Protestant Episcopal bishopric are located in Milwaukee. The 162 churches are distributed among the following faiths and creeds: Adventist, 1; Baptist, 9; Catholic, 31; Christian, 1; Christian Science, 4; Congregational, 8; Episcopal, 12; Evangelical, 7; Evangelical Association, 6; Jewish, 6; Lutheran, 38; Free Methodist, 2; Methodist Episcopal, 18; Mormon, 1; Presbyterian, 11; Reformed, 2; Spiritualistic, 2; Unitarian, 1; Theosophist, 1; Salvation Army barracks, 1; People's pulpit, 1. The property of the religious organizations is valued by the tax commissioner's department at $6,411,940. Some of the church edifices are architecturally beautiful, notably St. Paul's church, in the Norman style; St. Josaphat's, Byzantine; Gesu, Immanuel and St. James, Gothic. The convent of Notre Dame, which occupies a square in the heart of the city, is the mother house of the Order in the United States. In the suburb of St. Francis, the Catholic seminary of Pio Nono is surrounded by a magnificent tract of 200 acres. Marquette College (Catholic) and Concordia College (Lutheran) are located on the West Side.

Education.—There are 54 public schools, including a school for the deaf-mutes and four high schools. The total enrolment is 36,000. A state normal school, with an enrolment of 300 students, is the main source of supply for the teaching corps. Every primary and district school in the city, with two exceptions, has a kindergarten department, Milwaukee having been the pioneer city in the United States, a quarter of a century ago, to institute kindergarten instruction as part of the regular work in every school building below the high school grade. There are 71 parochial and private schools, with a total enrolment of nearly 22,000. In addition to the institutions heretofore mentioned, the Milwaukee-Downer College for young women is located here, in a group of buildings recently completed in the northern suburban district near Lake Michigan. Part of its endowment is obtained from an organization of

600 women known as the College Endowment Association, who conduct annually series of University Extension lectures for their own members in the Athenæum building. The Athenæum is owned by the Woman's Club, was built by them and is maintained as a successful business venture by them. The Layton Art Gallery, managed through a board of trustees, is open to the public without admission charge, and is the gift of Frederick Layton. The Johnston Emergency Hospital building was given to the city by John Johnston.

Government.—The elective city officers are a mayor, treasurer, comptroller, attorney and a common council consisting of two aldermen from each of the 23 wards, chosen biennially. The administrative functions are vested in appointive boards whose titles indicate their duties: Board of school directors (23), board of public works (4), public debt (3), city service commission (4), fire and police commission (4), school commission (4), public library board (9), public museum board (9), park board (5), emergency hospital board (9). All of the boards and commissions with a membership of four are required by law to be bi-partisan. Certain features of their administration and organization are peculiar to Milwaukee. The total number of persons in city service is 3,111, and 2,923 of these are under civil service rules with tenure of office during good behavior, leaving but 188 persons, including elective and honorary officers, not subject to such rules. The firemen and policemen were prior to 1885, when a bi-partisan board was created, removable for political causes; the official and labor service was placed within the shelter of a bi-partisan board's rulings in 1895; the school department has not been affected by politics since 1897. The school board organization is peculiar to Milwaukee. The school commission is bi-partisan, the mayor appointing one member of the four annually. Their sole duty is to select one-third the membership of the board of school directors annually on a strictly non-partisan basis. The library and public museum boards are composed of three aldermen and six 'citizen members' each, the library board electing its members as terms expire, except the aldermanic contingent, whom the mayor appoints. In 1902 the city had an assessed valuation of $171,881,364, of which $137,404,081 was on real estate and $34,477,283 on personal property. The tax rate was $23.37 per $1,000. Total tax levy for the year was $3,334,935.99. Property was assessed at about one-half market value. Total bonded debt 1903, Jan. 1, was $7,152,750 (including a water debt of $578,750), sinking funds held $418,800, making the net debt $6,733,950. Most of the bonds are subject to an annual call of about 5 per cent of the original issue.

History.—The first permanent settlement of Milwaukee is usually dated from 1818, when Solomon Juneau

erected his little log cabin on the east side of the Milwaukee river. French and English traders had been here before that date, and a procession of Jesuit priests and French voyageurs had preceded them. The first recorded visit of a white man on the site of the future city is in the journal of Father Zenobe Membré, a Recollet missionary priest who accompanied Robert Cavalier de la Salle on his memorable exploratory trip from Lake Erie to the Illinois country in 1679. He notes that both Mascoutens and Foxes were dwellers 'on the banks of the river called Melleoki.' John François Buisson de Saint Cosme journeyed in 1699 along the west shore of Lake Michigan from Michilimackinac to the Mississippi. 'On the seventh,' he wrote, 'we arrived at Melwarik (Milwaukee). This is a river where there is a village which has been considerable and inhabited by the Mascoutens and Foxes, and even some Pottawattamies.' The word Melleoki and its numerous variants, which by a process of evolution has become Milwaukee, is of Pottawattami origin and signifies 'good land.' Another definition accepted by some historians is 'council place,' this having been regarded as neutral territory by different tribes of Indians. The dwellers in the old Indian village were evidently a turbulent set, for Colonel Arent de Peyster, commandant at Michilimackinac, wrote of them in the early years of the Revolutionary War as 'runagates—a horrid set of refractory Indians.' Lieutenant James Gorrell, whose British regulars occupied the stockade at Green Bay in 1762 and gave it the high-sounding title of Fort Edward Augustus, wrote the name of the place as 'Milwacky.' An English trader lived among the Indians at this place in that year. Fur traders made brief stays in the village from time to time. Alexander Lafromboise and his brother were located as traders here in 1785, with a large stock of goods. In 1795 Jean Baptiste Mirandeau, a Canadian blacksmith who had married an Indian woman, built a cabin and made himself useful to the Indians by mending their firearms. He received as compensation game and furs. He died in 1819, being survived by a family of 10 children, who joined the Indians when the Milwaukee band was removed. Thomas Gummersall Anderson, the son of a Loyalist, was a resident upon the site of the future city of Milwaukee from 1803 till 1806. He took an active part in the capture of Prairie du Chien by the British during the War of 1812. When Solomon Juneau arrived in 1818, he found a Pottawattamie village. He settled on the east side of the Milwaukee river, which later was called Juneautown; the west side of the river became Kilbourntown, after Byron Kilbourn (1834), and George H. Walker gave the name of Walker's Point (1834) to the region south of the Menomonee river. Each of the three natural geographical divisions became the nucleus of a little community, and acrimonious rivalry was a natural re-

sultant. The different names of streets on opposite sides of the rivers, now connected by 28 bridges, are a survival of the bitter feelings then engendered. The village of Milwaukee, now the East Side, was organized 1837, Feb. 27. Kilbourntown, now the West Side, was annexed 1839, March 11; and Walker's Point, now the South Side, 1845, Feb. 5. The city was incorporated 1845, Feb. 5, and Solomon Juneau chosen the first mayor.

Noted Fires.—In the early morning of 1883, Jan. 10, a fire broke out in the basement of the Newhall House, and, communicating with the elevator shaft, in an incredibly short time had cut off all means of exit from the upper floors. Scores of the imprisoned guests and employees threw themselves from the windows, only to be crushed to death upon the pavement or railings below. It required weeks to fully explore the ruins and recover the remains of the victims. Nearly 100 lives were lost in this fire.

The most serious loss of property by fire in the history of the city occurred 1892, Oct. 28. By this fire there were nearly 300 buildings destroyed. All but two of the wholesale grocery houses of the city, many other commercial and manufacturing concerns, a part of the gas works, several hundred freight cars, and a large number of dwellings were burned. Over 2,000 people were rendered homeless by this fire. The loss was nearly $4,000,000.

Population.—(1840) 1,712; (1850) 20,061; (1860) 45,246; (1870) 71,440; (1880) 115,578; (1890) 204,468; (1900) 285,315; (1910) 373,857.

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MÌMÀNSÀ [from the Sanskrit *mân*, to investigate; hence, literally, investigation]: collective name of two of the six divisions of orthodox Hindu philosophy: see SANSKRIT LITERATURE. It is distinguished as *Pûrva-* and *Uttara-mîmânsâ*, the latter being more commonly called *Vedânta* (q.v.), while the former is briefly styled *Mîmânsâ*. Though the M. is ranked, by all native writers, with the five other philosophical systems, the term philosophy—as understood in a European sense—can scarcely be applied to it; for the M. is concerned neither with the nature of the absolute or of the human mind, nor with the various categories of existence in general—topics dealt with more or less by the other five philosophies; its object is merely to lay down

a correct interpretation of such Vedic passages as refer to the Brâhman'ic ritual, to solve doubts wherever they may exist on matters concerning sacrificial acts, and to reconcile discrepancies—according to the M., always apparent only—of Vedic texts. The foundation of this system is therefore preceded by a codification of the three principal Vedas—the R'ik, Black-Yajus, and Sâman—and has in view the existence of schools and theories which, by their different interpretations of the Vedic rites, had begun to endanger, or, in reality, had endangered a correct, or at least authoritative understanding of the Vedic texts. It is the method, however, adopted by the M. which imparted to it a higher character than that of a mere commentary, and allowed it to take rank as a philosophy; for, in the first place, the topics explained by this system do not follow the order in which they occur in the Vedic writings, especially in the Brâhma'na portion of the Vedas (q.v.); they are arranged according to certain categories, such as authoritativeness, indirect precept, concurrent efficacy, co-ordinate effect, etc; and secondly, each topic or case is discussed according to a regular scheme, which comprises the proposition of the subject-matter, the doubt or question arising upon it, the *primâ-facie* or wrong argument applied to it, the correct argument in refutation of the wrong, and the conclusion devolving from it. Some subjects treated of in the M., incidentally as it were, and merely for sake of argument, belong more to the sphere of philosophic thought than to that of commentatorial criticism; e.g., the association of articulate sound with sense, the similarity of words in different languages the inspiration or eternity of the Veda, the invisible or spiritual operation of pious acts, etc. The reputed founder of this system is Jaimini—of unknown date—who taught it in 12 books, each subdivided into four chapters, except the 3d, 6th, and 10th books, which contain eight chapters each; the chapters are divided into sections, generally comprising several Sûtras or aphorisms, but sometimes only one. The extant commentary on this obscure work is the *Bhâshya* of 'Sabara-swâmin, which was critically annotated by the great M. authority, Kumârila-swâmin. Out of these works, which, in their turn, quote several others, apparently lost, have arisen many other writings, explaining and elucidating their predecessors. The best compendium, among these modern works, is the *Jaiminîya-nyâya-mâlâ-vistara*, by the celebrated Mâdhavâchârya (q.v.).

MIME, n. *mīm* [L. *mimus;* Gr. *mimos*, a farcical entertainment, the actor in it, a mime: Gr. *mimo*, an ape: comp. Basque, *mama*, to mask one's self in a hideous manner]: *formerly*, a kind of farce; a dramatic performance among the ancient Greeks and Romans; an actor in such (see MIMES). MIMETIC, a. *mī-mĕt'ĭk*, or MIMET'ICAL, a. *-ĭ-kăl*, apt to imitate; imitative. MIMIC, a. *mĭm'ĭk*, or MIM'ICAL, a. *-ĭ-kăl*, inclined to imitate the manners and peculiarities of another. MIM'ICALLY, ad.

-ĭĭ. MIMIC, n. one who imitates the voice, gestures, and manners of another, in order to excite laughter; an actor: V. to speak or act like another in order to excite laughter or ridicule; in *zool.*, to assume, as certain animals do, the dress of other species or a close resemblance to natural objects; there is no evidence that such action is voluntary. MIMICKING, imp. *mĭm′ĭk-ĭng.* MIMICKED, pp. *mĭm′ĭkt.* MIMICRY, n. *mĭm′ĭk-rĭ*, the imitation of the voice, gestures, and manners of another, for sport or ridicule.—SYN. of 'mimic, v.': to counterfeit; mock; aim; imitate.

MIMES, *mīmz:* certain dramatic performances among the ancients, in which, with little attempt at art, scenes of actual life were represented, sometimes in improvised dialogue. The Greek M. appear to have been invented by the Greeks of Sicily and s. Italy. They were a favorite amusement of convivial parties, the guests themselves being generally the performers. Sophron of Syracuse, about B.C. 420, composed many in the Doric dialect, which were much admired, and which Plato was accustomed to read.—The Roman M. were not borrowed from the Greek, but were of native Italic growth. They were not only far ruder and coarser, but in some respects they were essentially different—the dialogue occupying a smaller place, and mere gesture and mimicry predominating. The humor and satire, however, were often genuine, though rough, and even indecent, and they were greatly relished by all classes; even the patrician Sulla was fond of them.

MIMETITE, n. *mĭm′ĕ-tīt*, or MIMETESITE, n. *mī-mĕt′-ĕ-sīt* [Gr. *mimētēs*, an imitator]: a mineral, arseniate of lead, occurring in regular six-sided prisms, of a yellowish-brown color—so called from its resemblance to pyromorphite.

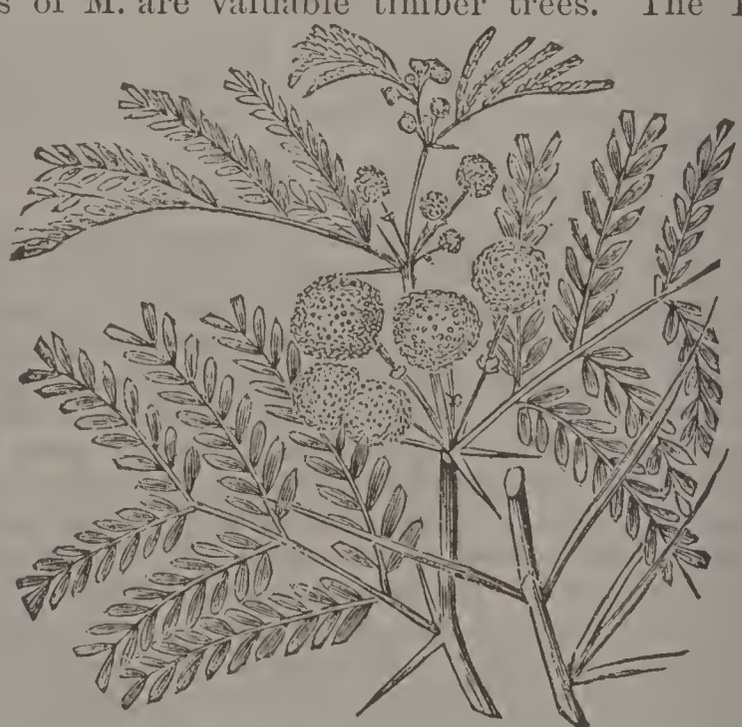
MIMIC, MIMICRY: see under MIME.

MIM′ICRY, in Biology: form of resemblance, wholly external and visible, and not due to kinship, by which a more defenseless and less numerous species, e.g., of butterflies, gain protection through their enemies mistaking them for another species, which some offensive odor or taste secures against attack. The studies of W. H. Bates, in *The Naturalist on the River Amazon*, 1863, first brought out, and adequately explained, the varied and surprising facts of M., which, so far as noted by earlier observers, had been considered one of the inexplicable curiosities of nature. In the Amazon valley, the richest butterfly region in the world, Mr. Bates found many species of butterflies, which are eatable by insect-devourers, but are, to a large extent, not attacked, because they closely resemble other more abundant species, which are protected by their offensive odor or taste. The acquisition of this protective resemblance has preserved the species, when otherwise their enemies would have destroyed them. The principle prevails very widely throughout nature. Wherever an extensive group is

protected, either by distastefulness or by offensive weapons, there are usually some species of eatable and inoffensive groups that gain protection by imitating them. The distasteful or offensive beetles, butterflies, wasps, bees, or ants thus afford protection to their imitators; poisonous snakes to non-poisonous, which mimic them; and, among birds even, the sparrow-hawk is related to the weak and defenseless cuckoo through M., and the powerful and noisy 'Friar-birds,' of the Malay Archipelago, protect the orioles, through the latter having gained resemblance to the former. Wallace in his *Darwinism*, 1889, explains the place of M. in nature. It is a curious fact that, while among land animals the number of known cases of M. is very large, among aquatic creatures it is very small.

MIMOGRAPHER, n. *mĭm-ŏg′ră-fẽr* [Gr. *mimos*, a mimic; *graphō*, I write]: a writer or actor of farces.

MIMOSA, n. *mĭ-mō′zä* [Gr. *mimos*, an imitator]: genus of leguminous plants including many species, one of which is the sensitive plant, so called from the leaves being more or less sensitive to the touch, sub-ord. *Mimōsĕæ*, ord. *Leguminōsæ*. MIMOSEÆ, sub-order of *Leguminosæ*, one of the largest nat. orders of exogenous plants; distinguished by regular flowers and petals valvate in bud: 28 genera and about 1,100 species are known, all natives of warm climates, a few only extending beyond sub-tropical regions in the s. hemisphere. The genera *Acacia* (q.v.) and *Mimosa* are best known. To the latter genus belong the Sensitive Plants (q.v.). Some of the larger species of M. are valuable timber trees. The TALHA



Mimosa Nilotica.

(*Mimosa ferruginea*) is one of the most common trees of central Africa. They are trees also of great beauty. Some species of the genus *Prosopis*, natives of the W. parts of South America, are remarkable for abundance of tannin in their pods.

MIMULUS, n. *mĭm′ū-lŭs* [dim. of L. *mimus*, a mimic actor—so named from the resemblance of the corolla to a mask]: genus of herbaceous plants of nat. order *Scrophulariaceæ*, having a prismatic 5-toothed calyx, a somewhat bell-shaped corolla, of which the upper lip is bifid and the lower lip trifid, the lobes not very unequal, two long and two short stamens, and a stigma of two lamellæ, which close together upon irritation. The species are mostly natives of America. Some are very frequent in flower-gardens, and many fine varieties have resulted from cultivation. They sometimes receive the name *Monkey-flower*. One species, *M. luteus*, native of Peru and Chili, has become naturalized in many parts of Britain. The little yellow-flowered MUSK PLANT, now so common in gardens and on window-sills in Britain, is *M. moschatus*, a native of Oregon and other north-western parts of America.

MINA, n. *mī′nă* [Gr. *mna;* L. *mina*—from an oriental word *maneh*, signifying weight]: among the *ancient Greeks*, *Romans*, or *Jews*, a weight; a coin. The Greek M. or Mna contained 100 Drachmæ (see DRACHM), and was the 60th of a talent; consequently, as a *weight*, it was equivalent to about $1\frac{1}{3}$ lb. avoirdupois, varying in different districts to the extent of one-third of a lb. more or less, following the fluctuations of the talent itself. As a *money of account*, it preserved the same relation to the talent, and was probably (on a general estimate) worth between $19 and $20.—M. or *Maneh* was also a Hebrew weight and money denomination; it was $\frac{1}{60}$ (or $\frac{1}{50}$) of a talent, and contained 50 shekels: its modern equivalent is roughly estimated at 2 lb. 6 oz. in weight, and somewhat more than $25 in money. But different localities had different standards and usages, and there were many fluctuations. See DRACHM: SHEKEL: TALENT.

MI′NA BIRD (*Eulabes Indicus* or *Gracula Indica*): species of Grakle (q.v.), or of a nearly allied genus, native of many parts of the E. Indies, about the size of a common thrush, of deep velvety black color, with a white mark on the base of the quill-feathers of the wings, yellow bill and feet, and two large bright yellow wattles at the back of the head. The bill is large, conical; the upper mandible a little curved and sharp-pointed. The food of the M. B. consists of fruits and insects. It is very lively and intelligent, and possesses a power of imitating human speech excelled by none of the parrots. It has sometimes been trained to repeat sentences of considerable length. It is therefore in great request, and is often brought to Europe.—Another and larger species is found in Sumatra and some of the other eastern islands, possessing the same power of articulation. It is highly prized by the Javanese.

MINAMOTO, or GEN: ancient noble family in Japan, for many centuries milit. vassals of the mikados. The M. family was founded by two grandsons of the 57th mikado, Seiwa (reigned 859–76). The two M. branches, descended from these princes, have supplied hundreds of milit. leaders to the service of the mikados. Yoritomo, the earliest shogun, or gov.-generalissimo, about the end of the 12th century, who became the real ruler, while the mikado's power was but nominal, was of the M. family. It was under the leadership of M. generals that the whole of e. and n. Japan, above 36° lat. n., was conquered, the aboriginal tribes made subject to the court at Kioto, and the mikado's sway extended even into Yezo. 17 noble families of the mikado's court are of M. descent; among them, Iwakura, Ohara, Higashi, Kuze, and others prominent in the govt. of Japan. The M. crest is three bamboo leaves surmounted by gentian flowers.

MINARET, n. *mĭn'ă-rĕt* [Sp. *minarete*, a high slender turret—from Ar. *mamârat*, a lamp, a lantern]: the lofty turret frequent in Saracenic architecture. It contains a staircase, and is divided into several stories, with balconies from which the priests summon the Mohammedans to prayer—bells not being permitted in their religion—and is terminated with a spire or ornamental finial. The minarets are among the most beautiful features of Mohammedan architecture, and are an invariable accompaniment of the Mosques (q.v.). In India, *Minars*, or pillars of victory, are frequently erected in connection with mosques; some of these are lofty and splendid monuments, that of Kootub, at Old Delhi, being 48 ft. 4 inches in diameter at base, and about 250 ft. high. The form of the M. was derived from the Pharos (q.v.), the ancient light-house of Alexandria.

MINAS GERAES, *mē'nâs zhā-râ'ĕs*, almost *zhā-rīs':* interior prov. of s.e. Brazil; an extensive and elevated table-land; 220,160 sq. m., intersected by mountain-chains, which send out minor ridges in every direction, inclosing extensive valleys, of fertile soil, and watered by large rivers. The chief summits are Itambi, 5,950 ft., and Itacolumé, 5,750. The chief river is the Sâo Francisco. The tropical situation of M. G. gives it luxuriant vegetation; forests rich in valuable timber and fine woods; and fields plentifully yielding corn, cotton, tobacco, coffee, millet, etc.; yet its elevation, about 2,000 ft. above sea-level, secures a healthful climate. The plains and the rich valleys furnish abundant pasture for cattle and hogs. Trade with adjacent states includes, export of coffee, tobacco, cotton fabrics, bacon, cheese, hogs, cattle, drugs, and precious stones; and import of wheat, flour, wine, salt, and manufactures. Manufactures are largely carried on, and embrace cotton and woolen goods, iron, rum, sugar, tobacco, wool, hats, etc. Communication from Rio de Janeiro, cap. of Brazil, is by a branch of the great Dom

Pedro II. r.r., built by the state, at a cost of $50,000,000, to connect M. G. and San Paulo, the most populous and prosperous province of Brazil, with the cap. The branch to M. G. passes from Entre Rios over the ranges of intervening mts. to Ouro Preto. There is a lack of good roads, necessitating the carriage of goods on the backs of mules. The formerly rich gold mines of M. G., the most valuable in Brazil, whence the name M. G. had its origin, have been mostly abandoned, either agriculture or diamond-mining being preferred, and the govt. having, at the discovery of diamonds, 1746, compelled closing of the gold mines in favor of the search for diamonds.

The history of M. G. as a prov. dates from 1833. It is divided into 14 districts; the cap. is Ouro Preto; other towns are Minas Novas, Mariana, Januaria, Diamantina, Sao Joao d'El Rey, etc. The chief towns have colleges, and a system of primary and grammar schools extends through the prov. Pop. (1888) 3,018 807.

MINATITLAN, *mē-nâ-tē-tlân':* town of Mexico, on the n. side of the Isthmus of Tehuantepec; 20 m. from the coast, by way of Coatzacoalcos river, on whose w. bank it is built, on low ground subject to periodical inundations. Cattle are raised, and these, with mahogany and other valuable woods, are its chief wealth. They are shipped at Vera Cruz, 125 m. n.w. Its connection by river with the Gulf of Mexico has suggested M. as the point of departure for an interoceanic canal across the isthmus, and also of a r.r. across to the Pacific.

MINATORY, a. *mĭn'ă-tėr-ĭ* [L. *minatōrĭŭs*, threatening —from *minārī*, to threaten]: threatening; menacing.

MINCE, v. *mĭns* [OF. *mincer*, to cut into small pieces: F. *mince*, thin, slender: It. *minuzzare;* F. *menuiser*, to break or cut small]: to cut or chop into small pieces; to walk with affected nicety; to omit a part for the purpose of suppressing the truth; to palliate; to extenuate; to speak with affected softness, and imperfectly. MINCING, imp. *mĭn'sĭng:* ADJ. having the character of that which minces; that chops into small pieces: N. affectation. MINCED, pp. *mĭnst:* ADJ. chopped into very small pieces. MIN'CINGLY, ad. *-lĭ*, in small parts; not fully; affectedly. MINCE-MEAT, a sweetmeat whose principal ingredients are raisins, currants, brandy, etc., and a small portion of finely cut meat. MINCED-MEAT, meat cut or chopped fine; the state of being nearly or wholly destroyed, as if cut into *minced-meat.* MINCE-PIE, a pie or pastry containing mince-meat. NOT TO MINCE MATTERS, neither to suppress, extenuate, or weaken the force of, as of the words of another.

MINCH, *mĭnch:* channel separating the island of Lewes from the counties of Cromarty and Ross, in n.w. Scotland. Its shores are exceedingly irregular; average width is about 28 m. The *Little Minch*, separating the island of Skye from that of North Uist and the neighboring islands in the Outer Hebrides, is more than 15 m. in width.

MINCIO, *mĭn'chō* (anc. *Mincius*): river of northern Italy, continuation of the Tyrolese stream, the Sarca. It emerges from Lake Garda at Peschiera, and after a course of about 38 m. through the province of Mantua, which it separates from Verona, falls into the Po, 8 m. below the city of Mantua. The Mincio has constituted an important basis of operation during the wars between Italy and Austria.

MIND, n. *mīnd* [AS. *gemynd*, memory, mind: Icel. *minni*, memory; *minna*, to remember: Ger. *meinen*, to think: Gael. *meinn*, mind: L. *mens* or *mentem*, mind; *memĭnī*, I remember]: intelligent power; the understanding; the power by which we perceive, think, or reason; intention; choice; purpose; thoughts; opinions; remembrance; recollections: V. to attend to; to regard with attention; to obey; to incline; to be inclined, as do you mind going; in *OE.*, to remind. MIND'ING, imp. MIND'ED, pp.: ADJ. disposed; inclined—much used in composition, as in *high-minded, low-minded, feeble-minded, double-minded.* MIND'LESS, a. *-lĕs*, stupid; heedless. MIND'EDNESS, n. *-nĕs*, inclination toward anything. MINDFUL, a. *mīnd'fûl*, attentive; heedful; observant. MIND'FULLY, ad. *-lĭ.* MIND'FULNESS, n. *-nĕs*, the quality of being mindful; regard. TO MAKE UP ONE'S MIND, to come to a decision; to determine. NEVER MIND, do not regard; it is of no consequence.—SYN. of 'mind, n.': intellect; spirit; soul; capacity; liking; inclination; affection; disposition; sentiments; memory;—of 'mind, v.': to notice; mark; regard; observe; attend to; heed.

MIND: mind is a term which, like consciousness, cannot be defined without using it or some synonym of it in the definition. The mind may be considered as that which experiences or permits consciousness, or as that consciousness itself. The term is used more or less interchangeably with several other terms, from which, however, some distinctions ought to be observed. Consciousness is one of these terms and applies to any state of mind, as sensation, feeling, will, etc., but with the emphasis rather definitely on the momentary state as momentary, whatever that may chance to be. The term mind in contradistinction to this, emphasizes the relatively *permanent unity* of these states of consciousness, whether this unity be thought of as a substrate of brain activities lying below the level of passing consciousness, or as an immaterial essence behind the scenes of overt mental life. The term soul is often used as equivalent to mind, although the common connotation of the word would imply a more spiritual entity than is generally involved in the use of the term mind. It must be admitted, however, that one usage recognizes the 'animal soul,' which is essentially synonymous with the concept of life. Finally, 'spirit' is sometimes used as connected so intimately with 'mind' as to render the two things hardly separable. The term spirit has nowadays for the most

part a religious and theological import. It appears, for example, whenever the question of immortality is at issue.

Psychology knows nothing of mind beyond what mind *does* and what its states *appear* to their possessors to be. Much is now known to this science as to how the mind grows and how it operates, what its limitations are and what the principles of its organization. But outside these bounds, whence the mind came, whither it is going, what its inner essence is as compared with the structure of physical matter, these are questions to which science at present has no sure answer. Indeed, it is disposed to consider them rather juvenile. If we know how a thing operates and, if it be a living thing, how it grows, we possess the most important practical knowledge about it. The rest may be safely left to curious speculation. For a discussion of certain fundamental properties of mind see the following terms: SENSATION, PERCEPTION, MEMORY, IMAGINATION, REASONING, FEELING, WILL, EMOTION, SUBCONSCIOUSNESS. See also MIND AND BODY.

MINDANAO, *mēn-dâ-now':* Philippines, the most southeastern and largest island of the archipelago, lying between lat. 5° 35′ and 9° 50′ n. and between long. 121° 53′ and 126° 28′ e., n.e. of Borneo. It is bounded on the e. by the Pacific ocean and on the w. by the Sulu sea; area 45,356 sq.m.; with its dependent islands 46,521 sq.m.

Topography and Climate.—The outline of the island is very irregular, and the coast is uneven and much indented with deep bays and inlets; the shore line is 1,592 m., and the width of the island from e. to w. 386 m. The island is very mountainous, particularly in the interior, the mountain system consisting of a number of irregular ranges extending generally n. and s., and as a rule approaching near the coast. The mountain formation shows the effect of earthquake and volcanic action, and there are many volcanoes, some of which are active. The principal peaks are Apo (10,312 ft.), near the southeastern coast, and Malindang (8,560 ft.) in the n.w. The island is drained chiefly by two large rivers, the Grande de Mindanao (q.v.), flowing s.w. and w., on the western side of the central mountain range, and the Butuán or Agusán, flowing n.w., on the eastern side of the same range. There are numerous other smaller streams and nine large mountain lakes. There are iron springs at Placer, in the province of Surigao; sulphur springs at Mainit, Surigao, and Balingasag, Misamis, and medicinal thermal springs at Malïbato. As the island is within 10° of the equator, the climate is hot and humid, but more equable than that of Luzon; rains are frequent and heavy.

Forests and Fauna.—The island is covered with forests of valuable woods for ship and house building and furniture making; among these are the molave narra (similar to the yellow pine), teak, ebony and cypress; the gum and resin producing trees and medicinal and dye plants

also grow abundantly. Animal life is abundant in these forests; over 200 species of birds have been classified, of which 17 species are peculiar to Mindanao and Basilan; deer, wild hogs, monkeys, and the haguang or colugo (q.v.) are numerous. Reptiles, including the giant lizard, iguana, and large snakes, particularly the boa, also infest the forests and crocodiles the river.

Industrial Resources.—The staple agricultural products are rice, sugar, cotton, corn, tobacco, indigo, coffee, and hemp; in 1899 Mindanao ranked fifth among the hemp-producing sections of the Philippines; other products of special value are cloves, nutmegs, cinnamon, and other spices, betel nuts and betel peppers. The most important industry is the cultivation and shipment of hemp, and forest products; large herds of cattle and horses are raised; and there is a little weaving of hemp and cotton fabrics for home use. Edible birds' nests are also gathered and exported. Communication is largely by water, as there are few roads except in the immediate vicinity of the chief towns, and the towns and villages are situated on the coast or on the large lakes and rivers. Gold is obtained is small quantities by the natives, and is doubtless abundant; coal, sulphur, copper and platinum are also reported.

People and Government.—Mindanao is peopled mostly by tribes of the Moro race, among whom the Mohammedan religion is dominant; Visayan peoples inhabit the provinces of Misamis and Surigao. The island was first occupied by United States troops in 1899, and since that time numerous garrisons have been established, and operations carried on with a view of regulating intercourse between the Filipinos and Moros, and of gaining the confidence of the people. The provinces of Misamis and Surigao were placed under civil government in 1901, the rest of the island remained under military control until 1903, June, when a law was passed by the Philippine Commission, providing civil government for Mindanao (exclusive of the two provinces mentioned above) and its adjacent islands, under the name of the Moro Province. Pop. 495,660. See PHILIPPINE ISLANDS; MOROS.

MINDANAO, GRANDE DE: a large river of the island of Mindanao, Philippines. It rises in the Rangayán mountains, flows s. to the Lake of Liguasan, and passing through this lake flows n.w. to Illana bay. About 25 m. from its mouth it divides into two branches, which enter the bay about 5 m. apart, with a large delta between them; the n. arm is the larger and more navigable; the s. arm is narrow and only 5 ft. in depth. The river is navigable for 70 m. for small vessels not drawing over 4 ft. Its course is mostly through a very fertile region, and it drains an extensive plain with several large lakes; in length and volume it is the largest river of the Philippines. In the upper part of its course it is known also as the Pulangui.

MIND AND BODY, The Inter-relation of (Theories). One of the oldest and one of the most persistent problems of philosophy is that of the mutual relations that obtain between consciousness and the physical world. One important part of this problem is concerned with the relation in which the mind stands to the body and its functions. It is obvious that the question involves an investigation into the nature of mind and of physical objects; for the essential connection between these things can be determined only when they have been brought together in a general theory of reality. In this connection, two tendencies are apparent in the history of philosophy; consciousness and the physical objects are (1) either regarded as ultimately different (the various forms of *dualism* [q.v.]) or (2) they are regarded as different appearances or aspects of a single reality (*monism* [q.v.]). Dualism has to show how two objects of different nature can maintain intimate relations; hence the theories of *causal interaction, parallelism* and *pre-established harmony.* Monism, on the other hand, having once declared for the real identity of mind and body, is called upon to explain how like objects or the same identical object can—as consciousness and as physical organism—appear totally different; hence the theories of *epiphenomenalism, panpsychism* and certain (monistic) forms of *parallelism.*

In psychology, the relation of mind to body presents quite a different problem. It becomes a problem of science, not of philosophy. The psychologist seeks to determine how, in the concrete, a given mental state or process or sequence of processes is related to, dependent upon, or conjoined with, given bodily processes or changes. With the questions of ultimate nature and of the final significance of the relation under discussion, the psychologist is not concerned. Psychology finds that mental processes are, as a matter of fact, connected with, conditioned by, physiological processes. The science proceeds therefore upon the *principle of parallel occurrence.* This principle is not, however, to be confused with the various philosophical theories of parallelism. It rests upon and proclaims psychophysical facts rather than a metaphysical doctrine intended as an interpretation and explanation of the facts.

MIND CURE: the theory or the practice of curing disease mainly by mental influence. If the result secured were dependent principally upon the effect of mind, it should be called mind cure, even though the healer or the patient or both believe the cure to be wrought by other agencies.

The following is a partial list of the agencies the results of which should probably be attributed to mind cure, although such an explanation is not usually admitted: absent treatment, amulets, anointing with oil, bits of the sacred cross, bones of saints, bread pills,

charms, Christian science, divine healers, electric belts, exorcism, faith cure, finger rings made from nails of a coffin, hands of executed criminals, some home remedies, hypnotism, idols, knee caps of lambs, laying on of hands, mental science, magnets, metal tractors, mesmerism, mystical rites, some patent medicines, philosophical healing, quacks, relics, right forefeet of female hares in pocket, royal touch, sacred images, sacred water, sacred places, shrines, spider's web pills, sugar pills, suggestion, talismans, thermometers held under tongue, thorns from sacred crown, vegetable electricity, witchcraft, will power.

Most of these agencies have been successful in securing beneficial results. It is quite possible that cures have been wrought by many of them that could not have been wrought in any other way. None of them is able to restore a lost organ or limb, to make sound a decayed tooth, to cope successfully with bacteria or to cure most of the purely organic diseases. Most of them are able to cure—partially or wholly—most organic diseases and such as are specially dependent upon the nervous system. Among the diseases benefited by mind cure the following are noteworthy (condensed from Dr. Bernheim's *Suggestive Therapeutics*): organic diseases of the nervous system, hysterical diseases, neuropathic affections, various neuroses, dynamic pareses, and paralyses, gastro-intestinal affections, various painful affections, rheumatic affections, neuralgias, menstrual troubles. In this list are included many of our most painful and persistent diseases.

The exact method whereby mind cure effects its results is imperfectly understood. We are also ignorant of the method whereby our muscles respond in voluntary movements. We are, however, fully aware of the fact that walking, raising the hand, masticating food, etc., are dependent upon the response of our bodies to our minds. We also know that many purely involuntary acts are dependent upon our thoughts. Thinking of savory viands causes the mouth to water; thinking of the act of swallowing makes the process difficult—hence the difficulty of taking a pill; excitement injures digestion; depressing thoughts change the rate of heart action; embarrassing thoughts cause the blood to rush to the face, etc. In some unknown way the mind may impede or facilitate every bodily process and hence may, especially under the stress of intense feeling, produce or relieve pains and various forms of functional diseases.

Although the mind cure may thus be applied to all forms of functional diseases, there is no warrant for the assumptions (1) that there is no need of drugs and surgery or other material means, or (2) that mind cure may be effective as absent treatment without the cooperation of the patient. Mind cure is most helpful in

preventing disease and in this particular its usefulness is not easily exaggerated. See FAITH CURE.

MIND DUST AND MIND STUFF: the mental particles, elements, atoms, or monads which, according to the view of pan-psychists, make up the universe. The theory results from the attempt to apply the analogy of physical atoms to the mind. The states of the mind are regarded as compounds built up of mental atoms. When all the elements are conceived as alike, the differences in the states of consciousness are explained by the manner of arrangement or combination of the elements. The difficulty is to show how a new quality can arise from the addition of elements which do not contain it. It is to avoid the difficulty of showing how the mind can evolve out of non-mental matter that the assumption is made by W. K. Clifford and others that all matter is mind stuff. The result of this theory is a metaphysical doctrine which is the opposite of materialism. The entire universe is mind; what seems to be matter is the reflection of particles of mind stuff in other mind stuff.

MINDEN, *mĭn'dĕn:* Prussian town, province of Westphalia, on the Weser, about 22 m. w.s.w. of Hanover. It is one of the oldest towns in Germany, a prosperous closely-built city; and was till lately a fortress of the second class. Minden has a stone bridge across the river, dating from 1518, and possesses several ancient churches, the most noteworthy of which is the present Rom. Cath. church, built in the second half of the 11th c., and till 1811 an episcopal cathedral. A battle was fought near Minden 1759, in which the French were defeated by an army of Anglo-Hanoverian troops.—Pop. (1900) 24,327.

For the Hanoverian town of Minden, properly Münden, see that title.

MINDORO, *mēn-dō'rō,* Philippines: an island lying s. of Luzon, a little n. of the centre of the archipelago; length n.w. to s.e., 110 m.; width, n.e. to s.w., 56 m.; area, 4,050 sq.m., with dependent islands, 4,108. There are numerous small rivers, but no general river system of main stream and tributaries. The climate is variable; the rainfall heavy and monsoons frequent; the western coast is temperate and healthy, but the northern and eastern coasts are hot.

At one time, before the decay of the Spanish monarchy, the rice yield was so abundant that Mindoro was called 'the granary of the Philippines'; but the frequent attacks of Moro pirates destroyed the prosperity of the island, and the agricultural products are now unimportant, being almost entirely for home consumption. Rice, sugar cane, cocoa, tobacco, hemp, cotton, etc., are raised; the cultivation of hemp is increasing, and a small amount of cotton is exported to the island of Ipil. In the time of the early Spanish explorers reports of great mineral wealth, especially gold, were circulated; the real

mineral resources are but little known, though as far as modern exploration has gone copper, gold and coal have been found. The island is heavily wooded, and its chief commercial wealth is in forest products; the trees include cedar, ebony, mahogany, gum trees, gutta-percha, palms and dye woods. Near the principal towns wood-cutting and rattan splitting for the Manila market is the chief industry; rattan, burí, honey, forest gums, balao oil, pitch, and other forest products are the chief articles of export; tortoise-shell, obtained from the small neighboring islands, and canoes cut from a single piece of wood are also exported; and there is a considerable production of sago. There are only a few roads, access to inland villages being by mountain trails or by river-canoes; the local trade between coast towns is carried on mostly by native sailing craft; all exports for Manila and other islands are concentrated at ports of call for steamers.

In 1902, June, civil government was extended to Mindoro and adjacent islands, and it was detached from the province of Cavité and made a sub-province of Marinduque. The inhabitants of the interior are wild tribes, among whom the Manguianes predominate; the people of the north coast are mostly Tagálogs, those of the south coast, Visayans. Pop., estimated to include wild tribes of interior, 106,200.

MIND READING: the discovery of the thoughts of another mind. That part of the so-called mind reading entertainment in which there is contact between the agent and percipient, is to be explained by muscle-reading. (See MUSCLE READING.) The question whether there is the possibility of discovering the thoughts of another without physical contact and without known means of communication has been investigated experimentally. The best results are reported when the percipient is hypnotized. It is claimed that it has been possible to get subjects to name substances which the hypnotist is tasting, to carry out actions thought of, to become rigid in a finger decided upon by the hypnotist, to otherwise act on suggestions made only mentally by the agent. Some of these tests were performed with the agent not in the same room. Experiments have also been tried with and without hypnosis in commmnicating mentally numbers, diagrams, drawings of simple objects, etc. The percentage of success in these tests seems to be greater than would be accounted for by chance; but the facts have to be interpreted with caution. Hansen and Lehmann, of Copenhagen, have found, for example, that involuntary whispering, even with the lips closed might, with a hyper-sensitive subject, explain the communication of numbers. The tendency for two persons to think along similar lines, the possibility of unintentionally giving clues by a glance or gesture, the possibility of unusual sensitivity, the fact that impressions are often received through the senses in ways of which the per-

cipient is not aware, the likelihood of unintentional deception and positive fraud, all have to be taken into account in determining whether there has been any real transference of thought independent of physical means. See TELEPATHY.

MINE, pron. *mīn.* [AS., Sw. and Dan. *min;* Icel. *minn;* Goth. *meins;* Ger. *mein,* my or mine]: the possessive case of the pronoun of the first person; belonging to me; my; that which belongs to me; in Scripture language and in old style, *mine* is put before a noun beginning with a vowel, *mine* iniquity.

MINE, n. *mīn* [F. *miner,* to dig underground, to mine —from id. L. *minārĕ,* to conduct, as along a vein of metal: Gael. *meinn;* W. *mwyn,* ore, a mine; It. *mina;* F. *mine,* a mine]: pit or excavation in the earth, from which ores are dug (see MINES, in Law; MINING): any rich source of wealth or good; an excavation filled with gunpowder for the purpose of blasting rocks, or in war for blowing up an enemy's works (see MINES, MILITARY): V. to sap; to form mines under; to excavate. MI'NING, imp.: ADJ. pertaining to or connected with the forming of mines; N. the art of making pits for the discovery of ores, etc., and everything relating to their systematic management (see MINING). MINED, pp. *mīnd.* MINER, n. *mī'nėr,* one who works in a mine. MI'NY, *a. -nĭ,* abounding with mines or excavations.

MINE GAS. See FIRE-DAMP.

MINER, *mī'nėr,* ALONZO AMES, D.D., LL.D.: clergyman, educator and reformer: b. 1814, Aug. 17—1895, June 14; b. Lempster, N. H. He studied at an academy, and in 1835 became principal of an academy at Unity, N. H. In 1839 he received ordination as a Universalist minister. He held pastorates in Massachusetts at Methuen, Lowell, and Boston, labored in the anti-slavery and temperance causes, and was prominently connected with the educational interests of the state. He was president of Tufts College 1862-74, was a member of the board of overseers of Harvard College, and was candidate for governor of the state on the prohibitionist ticket 1878, and for mayor of Boston 1893. He founded the Universalist publication house at Boston, edited the *Star of Bethlehem,* and wrote for various periodicals. Among his published works are *Old Forts Taken,* and *Bible Exercises.*

MINERAL, n. *mĭn'ėr-ăl* [F. *minéral,* a mineral—from *miner,* to mine: Sp. *mineral,* a mineral (see MINE 2)]: any inorganic body which is found on the surface or within the earth; a rock or stone; a metallic ore; a metal: ADJ. of or relating to minerals; impregnated with minerals; formed in or dug out of the earth. MINERALIZE, v. *mĭn'-ėr-ăl-īz,* to impregnate with mineral matter; to convert into a mineral. MIN'ERALIZING, imp. MIN'ERALIZED, pp. *-īzd.* MIN'ERALIZER, n. *-ī-zėr,* a substance which combines in an ore. MIN'ERALIZA'TION, n. *-ī-zā'shŭn,* the process of

converting any substance into a mineral; the process of impregnating with a mineral. MIN'ERALIST, n. *-ĭst*, one versed in or employed about minerals. MINERAL ACIDS, in medicine, ordinarily the following: Sulphuric Acid (q.v. *Sulphates*), Nitric Acid (q.v.), Hydrochloric Acid (q.v.), Phosphoric Acid (q.v. PHOSPHORUS), Chromic Acid (q.v.), Carbonic Acid (q.v.). MINERAL-BLUE, the name usually given to *azurite* when reduced to an impalpable powder for coloring purposes. MINERAL-CAOUTCHOUC, *-kô'chôk*, an elastic mineral pitch, a variety of bitumen, resembling caoutchouc in elasticity and softness—also called *elaterite*. MINERAL CHAMELEON (see MANGANESE). MINERAL-CHARCOAL, a term applied to silky fibrous layers of charcoal, which are interlaminated in beds of ordinary bituminous coal—known to miners as mother-of-coal. MINERAL DEPOSITS, term denoting metalliferous ores occurring naturally in geological formations: they consist sometimes of a single native metal, but usually of different metals mixed (see GANG or GANGUE; ORES; VEINS, in geology; MINING; also MINERALOGY; GEOLOGY). MINERAL-GREEN, a native green carbonate of copper. MINERAL-OIL, a familiar term for petroleum or rock-oil, which is found oozing out from strata of all ages, from the Silurian and Devonian upward. MINERAL PITCH (see ASPHALT). MINERAL RESINS (see RESINS). MINERAL-TALLOW, a familiar term for *hatchetine*, remarkable substance found in several places in Britain, Germany, Siberia, etc.; soft and flexible, yellowish white or yellow, resembling wax or tallow, often flaky like spermaceti, inodorous, melting at 115°-170° F., and composed of about 86 carbon and 14 hydrogen. MINERAL TAR (see ASPHALT). MINERAL WATER, water naturally impregnated with mineral matter (see below): also certain beverages artificially prepared (see AERATED WATERS).

MINERAL KINGDOM: inorganic portion of nature. Under this term, however, are not included the immediate inorganic products of organic beings—e.g., sugar, resins, etc., though substances more remotely of vegetable or even animal origin are reckoned among minerals, as coal, fossils, etc. To the mineral kingdom belong liquid and gaseous, as well as solid substances; water, atmospheric air, etc., are included in it. All the chemical elements are found in the mineral kingdom, from which vegetable and animal organisms derive them; but many of the compounds which exist in nature belong entirely to the vegetable and animal kingdoms, and are produced by the wonderful chemistry of life.

MINERALOGY, n. *mĭn'ĕr-ăl'ō-jĭ* [L. *minerale* and Gr. *logos*, a discourse]: the science which treats of the properties and classification of minerals. MINERALOG'ICAL, a. *-a-loj'ĭkăl*, pertaining to mineralogy. MIN'ERALOG'ICALLY, adv. according to the principles of mineralogy. MIN-

ERAL'OGIZE, v.i., *-jīz*, to collect and study minerals. MINERAL'OGIST, n. *-jĭst*, one versed in mineralogy.

Mineralogy deals with the composition, structure and other physical properties, origin and uses of minerals.

A mineral is an inorganic, homogeneous, liquid or solid occurring in nature. It is usually solid under ordinary conditions and has definite and characteristic form.

The first thing that one notices about a mineral is its color. But the more one becomes acquainted with the subject the less he depends upon color as a means of identification, since it is soon evident that a given species may exhibit more colors than any chameleon. The list of colors shown by such a mineral as quartz, for example, reads like a description of the spectrum.

However, color is a means of identification within certain limits, since some minerals are prevailingly light in color (quartz), others black (hornblende); some are red (ruby); others green (emerald); etc. Extended acquaintance shows that color is not only a source of beauty to a mineral but a characteristic useful in its determination.

The next thing that will be noticed is the manner in which light is reflected from the surface of minerals—i.e., the *lustre*. Some minerals look *greasy* (talc). Others have a *vitreous* lustre like broken glass (quartz). Others are *waxy* (chalcedony), or *silky* (satin spar), or *resinous* (sphalerite). Some are *dull* (kaolin), others look like polished metal, i.e., have *metallic* lustre (galena). Metallic lustre is more common on opaque minerals (those which do not permit the light to pass through them) than on translucent minerals (those which in thin sections permit light to pass), or on transparent ones (those which in thick sections permit light to pass freely). The lustre of a transparent mineral most nearly approaching metallic lustre is called *adamantine*, since it is so characteristic of the diamond.

If a mineral has been formed under favorable conditions it will show as definite shape as does a bird or fish or flower. It may be cubical, or pyramidal, or prismatic for example. The prisms of some minerals are four to eight sided. Others are six or twelve sided. Others have two wide lateral planes and narrow front and back planes.

If the characteristic external form is wanting the architecture may often still be discovered by breaking the mineral. Many minerals when struck a sharp blow split or cleave in a definite direction—salt into cubes, fluorite into octahedrons, calcite into rhombohedrons, etc. —thus showing their internal structure. Others simply break or fracture, leaving their broken surfaces smooth or splintery or pitted like a surface composed of shells (*conchoidal fracture*).

Then, again, upon taking a series of minerals in the hand one notices that they differ in weight. A rough estimate only can be made by hand. But if the mineral is weighed, then put in a vessel completely filled with

water and the overflowing water collected and weighed the *specific gravity* or ratio of the weight of the mineral to the weight of the same volume of water is obtained. This is a very characteristic property and hence a valuable means of identification. One does not have to collect the water, however. By employment of some instrument like the Jolly balance he can readily find the weight of the mineral in air (W), then its weight in water (w). The difference (W—w) represents the weight of an equal volume of water. Dividing the weight of the mineral by this gives the specific gravity, *S*. $S = \frac{W}{(W - w)}$.

Minerals differ in hardness. A few can be scratched with finger nail, more with a knife, and some are harder than a knife. Ten minerals have been chosen to form a *scale of hardness*. The softest, talc, is No. 1. Then follow in order gypsum, calcite, fluorite, apatite, orthoclase, quartz, topaz, corundum, and finally diamond, which is No. 10. With the exception of diamond all these minerals are abundant and every one interested can obtain a scale. The finger nail can scratch any mineral not harder than gypsum and the knife any mineral softer than quartz.

These properties—color, diaphaneity, lustre, shape, hardness and gravity—can all be observed by a beginner and studied without any instruments. But for the further investigations which are necessary to thoroughly pursue the subject various instruments are requisite.

To investigate mineral forms goniometers and microscopes are needed. A goniometer is an instrument for measuring the angles which mineral faces make with each other. For large crystals a contact goniometer is used. It consists of a graduated semicircle, to the center of whose diameter is pivoted an arm. The diameter is placed on one face of the crystal and the movable arm on the other, while the angle between the two faces to be measured is read on the circle. Very small crystals cannot be measured in this manner, hence recourse must be had to a reflecting goniometer, an instrument so constructed that a ray of light is allowed to fall upon one face at a time. The axis to which the crystal is fastened is turned till the light is reflected from the next face. Then the number of degrees between the two positions is read on the graduated disc to which the axis is attached and the supplementary angle thus obtained. Crystals which are too small for either of these two goniometers or are embedded in other material, may be studied by first gluing them to some kind of a handle, grinding them to a plane surface on one side, cementing the ground side to a glass slide and then grinding down the other side till the section is as thin as tissue paper and permits light to pass through readily. They may then be ex-

amined under a petrographical microscope. This method permits of accurate measurements.

The study of mineral forms constitutes the subject matter of *crystallography*. As a result of the careful work which has occupied crystallographers ever since the days of the Abbé Haüy (1801) it has become known that all minerals which have crystallized under favorable conditions show forms which are comprised in six groups. More groups are not possible, less would not be all inclusive. These groups or *systems* are the Regular, Tetragonal, Hexagonal, Orthorhombic, Monoclinic and Triclinic systems. In the Regular system are embraced all forms which are constructed on three axes of equal length and which form right angles with each other. In the Tetragonal system occur the forms two of whose axes are equal while the third is greater or less than the other two. All are at right angles. The Hexagonal system is characterized by three horizontal axes equal in length, making angles of 60° with each other, but at right angles to the vertical axis, which in turn may be longer or shorter than the horizontal axes. The Orthorhombic system has three axes at right angles to each other, but all of different length. In the Monoclinic system one axis, the *a* axis, inclines forward, thus making an obtuse angle in the upper front quarter with the *c* axis. Finally, in the Triclinic system, both lateral axes, *a* and *b*, are inclined to the vertical *c*, forming angles none of which are right angles.

The Triclinic system is the least symmetrical, having neither axes nor planes of symmetry, but a center of symmetry only. The Monoclinic system possesses one axis of twofold symmetry, one symmetry plane, and a center of symmetry. The Orthorhombic system has an axis of twofold symmetry, which is formed by the intersection of two planes of symmetry or is perpendicular to two axes of symmetry. In the Hexagonal system there is an axis of threefold or of sixfold symmetry, besides four planes and a center of symmetry. Crystals in the Tetragonal system possess one axis of fourfold symmetry and there may be five planes of symmetry besides a center of symmetry. Finally, the Regular system has the greatest degree of symmetry possible, possessing four axes of threefold symmetry and sometimes nine planes of symmetry.

In the measurement of crystals and in their representation and discussion mathematical terms and principles are so brought into requisition as often to obscure the fact that not mathematics, but the physical condition of the mineral world is the subject of study. The science of mineralogy simply embodies and elucidates these principles. In minerals of the highest symmetry (Regular system) there are three directions at right angles to each other in which light or heat or electricity travel with equal ease and rapidity. When acted upon by corrosive

solutions the mineral is dissolved with equal rapidity in all three directions.

Minerals crystallizing in the Tetragonal and Hexagonal systems on the other hand respond to physical and chemical forces more rapidly or more slowly parallel to the vertical axis (*c*) than they do parallel to the other lateral axes. And the minerals characterized by Orthorhombic, Monoclinic, or Triclinic crystallization have three directions in which they respond to external influences with different speed and different results.

The laws of crystallization are just as inevitable and inexorable as the laws of gravitation. They rule all inorganic substances in the world and in all other heavenly bodies as far as we know.

Under unfavorable conditions minerals may fail to develop their characteristic crystallization and are said to be *amorphous*. For example, at ordinary temperatures water, mercury and some other substances do not crystallize. But at 32° F. water crystallizes into hexagonal crystals and at 40° below zero mercury crystallizes into regular crystals.

Crystallography is one of the readiest means of identification and an important factor in the classification of minerals. But the fundamental basis for the chief divisions of the mineral kingdom is chemical. Minerals are placed in one of seven classes, according as they are composed of one simple individual chemical substance (Class I., Elements), or result from the union of some chemical base with sulphur (Class II., Sulphides), or the union of two bases with sulphur (Class III., Sulphosalts), or the union of a base with a halogen (Class IV., Haloids), or the union of a base with oxygen (Class V., Oxides), or the union of a base with oxygen and another acidic element (Class VI., Oxygen Salts), or the union of carbon and hydrogen (Class VII., Hydro-Carbons). Within these classes the grouping is in accordance with the more minute chemical subdivisions and in accordance with their crystallography.

More than one thousand mineral species are known, but of them less than one hundred are common enough to be abundantly met with. And a student who becomes acquainted with the smaller number may have a fair conception of the inorganic world, inasmuch as this number exhibit all the chemical and physical laws, methods of studying minerals, and their relation to the economy of the universe and to mankind.

Among the elements, diamonds, graphite, sulphur, antimony, bismuth, gold, silver, copper, mercury, iron, and platinum are well known. The most noteworthy sulphids (Class II.) are stibnite, molybdenite, galena, argentite, chalcocite, sphalerite, cinnabar, chalcopyrite, pyrite, marcasite, arsenopyrite—minerals which are useful as the source of antimony, molybdenum, lead, silver, copper, zinc, quicksilver, sulphur, and arsenic. The sulpho-salts

(Class III.) are of slight importance, but the haloids (Class IV.) include some minerals which are indispensable to mankind. For example, halite, common salt, has the distinction of being the mineral which is most largely used as food by men. Fluorite is useful as a flux in iron manufacture, is the source of hydrofluoric acid, and is necessary in the making of enamel glass. For a long period cryolite was the chief source of aluminum, though now beauxite is most largely used for that purpose. Among oxides (Class V.) quartz holds a chief place, since it is the most abundant mineral in the world. It is the chief constituent of sand, sandstone, quartzite, and many igneous and metamorphic rocks. It is found everywhere. In its common forms it is useful in building and the manufactures, and in its more beautiful forms it is used as an ornamental stone. Cuprite, zincite, corundum, hematite, magnetite, chromite, cassiterite, rutile, pyrolusite, manganite, limonite, are all important minerals, since they are available sources of copper, zinc, ruby, iron, chromium, tin, titanium, and manganese. Oxygen salts (Class VI.) is by far the largest of all the classes, since it embraces salts of ten groups of oxygen acids known as the carbonates, silicates, nitrates, phosphates, niobates, sulphates, tellurates, chromates, molybdates, and uranates. Among the carbonates are calcite and dolomite, which, taken together, are the third in abundance in the world. As limestones of greater or less purity they form widespreading rock masses. Magnesite, rhodochrosite, siderite, aragonite, witherite, strontianite, cerussite, malachite, are important because of their abundance, beauty, and utility. The silicates are the most numerous of any of the oxygen salts or of any other classes for that matter. They include more than two hundred species. While the oxides have the mineral (quartz) most abundant in the world, and the carbonates the mineral (calcite) third in abundance, the silicates have the mineral (feldspar), which is second in abundance. The feldspars are mountain builders, being the chief constituents of the igneous rocks. Their decomposition furnishes soils valuable for agricultural purposes, and clays used in the manufacture of brick, tile, porcelain, etc. Other silicates important as rock formers are olivene, pyroxene, amphibole, talc, serpentine, topaz, sodalite, mica, epidote, and garnet. Among phosphates apatite is the most noteworthy, because of the size and perfection of its crystals and because of its value as a fertilizer. Several sulphates are useful, notably, baryte, celestite, anglesite, and gypsum: the first three furnishing barium, strontium, and lead, and the last being the source of plaster of paris.

The characteristics of all of these minerals, as well as of others that are rarer, are thoroughly described in such books as Mier's or Dana's mineralogies.

The chemical investigation of minerals is carried on by means of acids, alkalies, and heat. The minerals are usually pulverized as finely as possible, first in a 'diamond mortar' (a two inch piece of hardened steel, in the centre of which is a half inch deep cavity to serve as a mortar for a steel pestle), and then in an agate mortar. Then the minerals are dissolved in various reagents until their different constituents are obtained. To hasten the action of the solvents the minerals are often held on a platinum support in a Bunsen or blowpipe flame after having been mixed with some advantageous flux. When metals are sought charcoal slabs are useful supports. Minerals differ greatly in the ease with which they melt. A scale of fusibility is formed by the following seven minerals: No. 1—A small splinter of stibnite melts when held in a candle flame. No. 2—Natrolite requires a little hotter flame to melt it into a globule. No. 3—Almadine garnet in the blowpipe flame rounds into a globule. No. 4—Actinolite in such a flame rounds only on the edges. No. 5—Orthoclase requires a still longer heating. No. 6—Bronzite in the thinnest splinters shows traces only. No. 7—Quartz is quite infusible.

The colors given off by minerals held in the Bunsen flame are very characteristic of certain of them.

Some minerals heated in a glass tube deposit their volatile constituents on the cold part of the tube. Many oxidize when heated in an open tube. Many are reduced on charcoal and deposit oxidizable portions as rings. For detection of these rings aluminum or gypsum supports are useful. Borax and microcosmic beads and treatment with cobalt nitrate aid in the detection of various constituents. These methods, which constitute the department of blowpipe analysis and are set forth at length in such a book as Brush's Blowpipe Analysis, are the simplest and most expeditious means of mineral investigation.

Bibliography.—For Crystallography and Physical Mineralogy: Dana, *Text Book of Mineralogy;* Williams, *Elements of Crystallography;* Moses, *The Characters of Crystals.* More elementary works are: Dana, *Minerals, and How to Study Them;* Ballard, *The World of Matter;* Crosby, *Common Minerals and Rocks;* English, *Recreations in Elementary Mineralogy.* For optical mineralogy: Rosenbusch-Iddings, *Microscopical Physiography of the Rock-Making Minerals;* Luquer, *Minerals in Rock Sections.* For determinative mineralogy: Brush-Penfield, *Determinative Mineralogy and Blowpipe Analysis;* Endlich, *Manual of Qualitative Blowpipe Analysis and Determinative Mineralogy;* Crosby, *Tables for the Determination of Common Minerals;* Frazer, *Tables for the Determination of Minerals by Physical Properties.* For descriptive mineralogy: Dana, *System of Mineralogy;* Hintze, *Handbuch der Mineralogie.*

MINERAL WATERS, NATURAL: usual term for all spring waters which possess qualities in relation to the animal body different from those of ordinary water (which itself also is ranked in the mineral kingdom). Artificial M. W., usually imitations of some natural waters, are very largely manufactured, and are of service in some cases; but in curative effect they are not to be compared with the natural product: see AËRATED WATERS. M. W. have been used as remedial agents from a very early period. The oldest Greek physicians had great faith in their curative power, and the temples erected to Æsculapius were usually in close proximity to mineral springs; they had recourse to the sulphurous thermal springs of Tiberias (now Tabareah), still used by patients from all parts of Syria in cases of painful tumor, rheumatism, gout, palsy, etc.; and to the warm baths of Calirrhoe, near the Dead Sea, mentioned by Josephus as tried by Herod in his sickness. We are indebted to the Romans for the discovery not only of the mineral thermic springs in Italy, but of some of the most important in other parts of Europe, e. g., Aix-la-Chapelle, Baden-Baden, Bath, Spa in Belgium, and many others; and Pliny, in his *Natural History*, mentions a very large number of mineral springs in almost all parts of Europe.

The therapeutic action of M. W., or of spas, as they are frequently termed, depends chiefly on their chemical composition and their temperature, though a variety of other circumstances, as situation, elevation, climate, geological formation, mean temperature, etc., have important bearing on the success of the treatment.

The best time for undergoing a course of M. W. is, in u. temperate regions, in the majority of cases, during June, July, August, and September. There are, however, exceptions depending on climate; e.g., at Gastein (q.v.), famed for thermal springs, the weather is changeable and stormy in June and July, but pleasant in May, August, and September. Early rising is usually advisable during a course of M. W., and, as a general rule, the water should be drunk before breakfast, at intervals of about a quarter of an hour between each tumbler, moderate exercise being taken in the intervals. In many cases, bathing is of even greater importance as a remedial agent than drinking. Baths are taken usually between breakfast and dinner; and should never be taken soon after a full meal. The time during which the patient should remain in the bath varies much at different spas, and the directions of the local physician should be strictly attended to on this point. It is impossible to determine beforehand how long a course of M. W. should be continued, as this entirely depends on the symptoms observed during treatment; but as a general rule, the treatment should not be protracted beyond six weeks or two months, and in some cases this is too long; but on this point the patient must be guided by the physician resident at the spa, or by one who knows both the water and the patient. Indulgence in the pleasures of the table,

and excesses of any kind, frequently counteract all salutary effects of the waters, while perfect mental relaxation is an important auxiliary to the treatment. Spas are suitable remedies for only *chronic* disorders; though among such disorders are to be ranked weariness and languor from over-work, mental or bodily, not as yet developed into marked symptoms of any disease.

No classification of M. W. based on their chemical composition can be strictly exact, because many springs are intermediate between well characterized groups. The following classification, adopted by Dr. Althaus, *Spas of Europe* (Lond. 1862), is perhaps the most convenient: 1. Alkaline Waters; 2. Bitter Waters; 3. Muriated Waters; 4. Earthy Waters; 5. Indifferent Thermal Waters; 6. Chalybeates; 7. Sulphurous Waters.

1. The Alkaline Waters are divisible into: (*a*) *Simple Alkaline Acidulous Waters*, of which the chief contents are carbonic acid and bicarbonate of soda. The most important European spas of this class are the thermal springs of Vichy and the cold springs of Fachingen, Geilnau, and Bilin (q.v.). These waters are useful in certain forms of indigestion, in jaundice from catarrh of the hepatic ducts, in gall-stones, in renal calculi and gravel, in gout, in chronic catarrh of the respiratory organs, and in abdominal plethora. Vichy (q.v.) may be taken as representative of this class of springs. (*b*) *Muriated Alkaline Acidulous Waters*, which differ from the preceding sub-group in additionally containing considerable chloride of sodium. The most important spas of this kind in Europe are the thermal springs of Ems (q.v.), and the cold springs of Selters (q.v.), Luhatschowitz, and Salzbrunn (q.v.). They are useful in chronic catarrhal affections of the bronchial tubes, the stomach, and the intestines, and the larynx; and the Ems waters have high repute in certain chronic diseases of the womb and adjacent organs. (*c*) *Alkaline Saline Waters*, of which the chief contents are sulphate and bicarbonate of soda. The most frequented are the warm springs of Carlsbad (q.v.) and the cold springs of Marienbad (q.v.). Patients suffering from abdominal plethora are those most frequently sent to these spas, which often prove of great service, if the stagnation of the blood is owing to habitual constipation, pressure from accumulated fæces, or congestion of the liver, unconnected with diseases of the heart or lungs. These waters, especially those of Carlsbad, afford an excellent remedy for the habitual constipation frequently arising from sedentary occupations; the result being much more permanent than that produced by strong purgative waters.

2. The chief contents of the Bitter Waters are the sulphates of magnesia and soda; and the best known spas of this class are those of Püllna, Saidschütz, Sedlitz, Friedrichshall, and Kissingen (q.v.); though there are two English spas—the bitter water of Cherry Rock, near Kingswood, in Gloucestershire, and the Purton Spa, near Swindon, in Wiltshire—which 'are, by their chem-

ical composition, admirably suited for the treatment of many cases of disease, and may perhaps even prove superior to the continental spas of this class.'—Althaus, *Spas of Europe*, 360. These waters act both as purgatives and diuretics, and may therefore be used advantageously in the numerous cases in which it is advisable to excite the action both of the bowels and of the kidneys.

3. The Muriated Waters are divisible into: (*a*) *Simple Muriated Waters*, of which the chief contents are a moderate quantity of chloride of sodium or common salt. The chief spas of this class are Wiesbaden (q.v.) and Baden-Baden (q.v.), which are hot; those of Soden (in Nassau), of Mondorf (near Luxembourg), and of Canstatt (near Stuttgart), which are tepid; and those of Kissingen (q.v.), Homburg (q.v.), and Cheltenham (q.v.), which are cold. The muriated saline springs of Saratoga, N. Y., are some of them chalybeate, others sulphurous or iodinous; all being rich in carbonic acid gas: they are used chiefly in cases of gout, rheumatism, scrofula, and abdominal plethora. (*b*) *Muriated Lithia Waters*, of which the chief contents are the chlorides of sodium and lithium. In gout, they first aggravate the pain, but then give relief; and in periodic headache, they have been found serviceable. (*c*) *Brines*, whose chief contents are a large amount of chloride of sodium or common salt. Among the spas of this kind in Europe, those of Rehme in Westphalia, and Nauheim in Hesse, have the greatest reputation. They are employed mostly for bathing, and are often of much service in scrofula, anæmia, rheumatism, certain forms of paralysis, and catarrh of the mucous membranes. (*d*) *Iodo-bromated Muriated Waters*, in which, besides a moderate quantity of chloride of sodium, the iodides and bromides of sodium and magnesium are contained in an appreciable quantity. Kreuznach (q.v.) is the most celebrated of this class. Its waters are used both for drinking and for bathing, and are of service in scrofulous infiltrations of the glands, in scrofulous ulcers, in chronic inflammation of the uterus and ovaries, etc. The waters of Hall, in Austria Proper, also are of this class, and have high reputation in cases of bronchocele or goitre.

4. Earthy Waters, of which the chief contents are sulphate and carbonate of lime. The most important European waters of this class occur at Wildungen, Leuk (q.v.), Bath, Eng. (q.v.), Lucca (q.v.), and Pisa (q.v.). The Wildungen water, exported in large quantities, is, according to Dr. Althaus, 'a capital diuretic, and not only promotes the elimination of gravel and renal calculi, but by its tonic action on the mucous membrane of the urinary passages, serves to prevent the formation of fresh concretions. It is also much used for chronic catarrh of the bladder, neuralgia of the urethra and neck of the bladder, dysuria, and incontinence of urine.' The baths of Leuk, in which many patients remain nine hours daily (4 A.M. to 10 A.M., and 2 P.M. to 5 P.M.),

until an eruption appears, are used chiefly in chronic skin diseases. The waters of Bath, Pisa, and Lucca, which are thermal, are useful in chronic skin diseases, scrofula, gout, rheumatism, etc.

5. Indifferent Thermal Waters, which usually contain a small amount of saline constituents. Of the spas of this class, the most important in Europe are Gastein (q.v.) (95° to 118°) Töplitz (q.v.) (120°) Wildbad (q.v.) (96°), Warmbrunn (100°), Clifton (86°), and Buxton (q.v.) (82°). Their most striking effects are to stimulate the skin and excite the nervous system. 'They are used especially in chronic rheumatism and atonic gout; in diseases of the skin, such as prurigo, psoriasis, lichen; in neuralgia and paralysis due to rheumatic and gouty exudations, to parturition, or to severe diseases, such as typhoid fever and diphtheria; in hysteria; and in general weakness and marasmus.'—Althaus, *Spas of Europe*, 421.

6. Chalybeate Waters, divisible into: (*a*) *Simple Acidulous Chalybeates*, whose chief contents are carbonic acid and bicarbonate of protoxide of iron; and (*b*) *Saline Acidulous Chalybeates*, whose chief contents are sulphate of soda and bicarbonate of protoxide of iron. For these, see CHALYBEATE WATERS.

7. Sulphurous Waters, which contain sulphuretted hydrogen or metallic sulphides (sulphurets), or both. The most important sulphurous thermals of Europe are those of Aix-la-Chapelle (q.v.), Baden (near Vienna), Barèges (q.v.), Eaux-Chaudes, and Bagnères de Luchon; while among the cold sulphurous springs, those of Nenndorf (in Hessen-Nassau) and Harrogate (q.v.) are of great importance. They are extensively used in chronic diseases of the skin, and are of service in many cases in which exudations require to be absorbed, as in swellings of the joints, in old gunshot-wounds, and in chronic gout and rheumatism. In chronic laryngeal and bronchial catarrh they frequently give relief, and in chronic poisoning by lead or mercury they favor the elimination of the poison, though to a far less degree than iodide of potassium taken internally. The sulphurous waters are employed externally and internally, and mineral mud-baths are believed by many physicians to form a valuable auxiliary to this treatment.

For further information on this subject, see Althaus; the *Dictionnaire Général des Eaux Minérales et d'Hydrologie Médicale*, by Durand-Fardel, Le Bret, and Lefort; and the very valuable work on the *Mineral Waters of Europe*, by Fichbourne and Prosser James (1883).

The chief simple alkaline springs of the United States are, the Bladon, Ala.; the Cal. Seltzer, Cal.; the Perry and Versailles, Ill.; the St. Louis, Mich.; the Sheldon (including Missisquoi), and the Weldon, Vt.; and the Des Chutes hot (143° to 145°), Oregon.

Of alkaline saline springs examples in the United States are, the Lansing well, Mich.; the Ballston spa, Saratoga co., N. Y., and the Albany artesian well, N. Y.; Milhoit's soda, Or.; and for thermal, the Idaho hot (85°

to 115°), Colo.; and the Charleston artesian well (87°, 1,250 ft. deep), South Carolina.

Of purgative or bitter water springs in the United States there may be noted, the Crab Orchard, Ky., from which the Crab Orchard salts are made; the Estill or Irvine, Ky., the water of which is strongly charged with sulphate of magnesia: and the Harrodsburg, Ky., in the water of which the laxative effect is qualified by equal amounts of sulphate of lime and of carbonate of iron. The Bedford springs, Penn., are purgative-chalybeate.

The muriated class of waters is represented especially by the springs at Saratoga. These waters are charged with carbonic acid gas, together with bicarbonates of lime, magnesia, and iron, which result from the solvent power of the acid gas upon limestone and some other rocks. Hathorn is the strongest of the Saratoga waters. The Seltzer has the mild quality desirable for use with wines The Congress is valuable as containing in the best proportions the substances which give both agreeable flavor and satisfactory medicinal effect. The Ballston Artesian Lithia spring furnishes the most concentrated water yet obtained in this country. All the Saratoga waters contain more or less bicarbonate of iron, and are thus chalybeate, though this character is masked by the greater amount of other mineral constituents. Springs allied to the Saratoga are, the Santa Clara Congress, Cal.; the Rockbridge Baths, Va.; the Capon Bath, W. Va.; the Artesian well, St. Louis, Mo. (2,199 ft. deep); the Spring Lake and Fruit Port wells, Mich., resembling very much the Creuznach, Prussia; and the St. Catherine's, Canada, the waters of which are similar but stronger.

Springs characterized by the presence of free mineral acids, as sulphuric or hydrochloric, are found in the United States and in S. America. The Rio Vinagre proceeds from such springs, and its waters carry off daily no less than about 70,000 lbs. of concentrated muriatic acid, and over 80,000 lbs. of oil of vitriol. The Oak Orchard acid spring in N. Y. is noted for the same sort of water.

Of calcic or earthy springs, examples in the United States are (1) thermal, the San Bernardino (100° to 175°), Cal.; the Agua Caliente (139°), N. Mex.; the Sweet and the Berkeley (both 74°), W. Va.; the Warm springs (97° to 102°), N. Car.; and the Bethesda, Wis.; (2), cold, the Butterworth, and the Leslie, Eaton Rapids, and Hubbardston wells, Mich.; the Yellow springs, O.; and the Gettysburg, Penn.

In the class of indifferent thermal, the noted United States waters are those of the Hot springs (57 of them, 93° to 150°), Ark.; the Healing, the Holston, and the Hot springs (the latter 102° to 108°), Va.; the Shasta co. Tuscan, Cal.; and the Lebanon, N. Y.

The chalybeate springs, characterized by bicarbonate of iron, or in the poorer waters by the sulphate, are represented in the United States by the Schooley's Mt.,

New Jersey; Fry's soda, California; the Stafford, Connecticut; the Greencastle, Indiana; the Catoosa, Georgia; the Schuyler county, Illinois; the Owasco, Michigan; Cooper's well, Mississippi; the Beersheba, Tennessee; the Rawley, Virginia; and the Bayley, Alabama. There are grouped with these the alum waters, found in the Rockbridge, the Pulaski, the Bath, the Stribbling, the Church Hill, the Bedford, and the Variety—all in Virginia, and the Oak Orchard acid, New York.

The United States have numerous examples of sulphur waters, as the White, Red, and Salt Sulphur springs of Virginia; the White Sulphur springs of Ohio; and the Richfield, Sharon, Chittenango, and Florida springs of New York.

Silicious waters, especially those of hot springs with a large charge of silica, are represented by the famous geyser in Iceland, by the geysers of California, and by the still more famous hot springs of the Yellowstone Park, where hundreds are found, one of them throwing, in outbursts about 32 hours apart, a column of hot water 8 ft. in diameter and 200 ft. high.

Saline waters, in the form of the brines from which salt is made, occur most abundantly in Michigan and New York; also in West Virginia, Ohio, and Kansas. The brine at Syracuse, N. Y., is pumped up from wells 400 to 500 ft. deep. A peculiar type of mineral water is found where a heavy charge of biborate of soda, or borax, is present. Lakes of great size have been found in California, the water of which is very rich in borax, apparently supplied to them by hot springs.

There are numerous other springs, not strongly marked in a chemical analysis, but found practically valuable, and therefore favorite with the public: a specimen of these is the Poland spring, Maine.

MINERAL WELLS: Texas, situated at the foot of the Palo Pinto Mountains in Palo Pinto county, is noted throughout the Southwest as a health and pleasure resort. It is on the Weatherford, Mineral Wells & Northwestern railroad, has an elevation of about 1,200 feet, with an average temperature in the winter of 45° F. and in the summer of 85° F. The surrounding country is of rich sandy soil, partly mountainous and especially adapted to the raising of corn, cotton, wheat, fruit and vegetables. In 1880, J. S. Lynch, whose family had been in bad health in other sections, located on the present site of Mineral Wells. There being no water convenient a well was bored and though the water had a peculiar taste it was used exclusively. A rapid improvement in the health of the Lynch family was naturally attributed to the use of the water, and others near by were attracted, and still other cures were effected. Thus began the life of a resort which is visited annually by from 100,000 to 200,000 health and pleasure seekers and which, according to government reports, is the leading mineral water ship-

ping point of the United States. These waters are pumped from about 15 different wells of a depth of 130 feet, and vary in strength and character from the mildly laxative to the strongly alkaline, purgative and diuretic. The chief ingredients are sulphate, carbonate, and chloride of sodium, calcium carbonate, magnesium carbonate, and iron.

The principal applications of these waters is in diseases of the stomach and liver, Bright's disease, diabetes, constipation, rheumatism, insomnia, nervousness, and uric acid disturbances.

MINERAL WOOL: a product of molten slag, or rock under air or steam-jet, also called slag wool, rock wool, silicate cotton, cotton fibre. The result of this process is a thin vitreous fibre, useful as a non-conductor. It was first manufactured in Germany in the early 70's. In 1875, a little was made at the Greenwood iron furnace, Orange county, N. Y.; the industry was firmly established by 1885; then because of the entry into the field of rock wool, that is, a fibre made directly from the rocks and not from slag, the slag wool industry fell off. The slag wools have a small percentage of sulphur, unless especially desulphurized after the slag has been re-melted, and thus sulphuric acid may be formed if water gets access to the wool and acts on the calcium sulphide in it. The sulphuric acid thus formed is injurious to the pipes. Hence rock wool is substituted for slag wool, or the slag wool is carefully desulphurized. Mineral wool of either sort, if of good grade, is one of the best practical non-inflammable coatings; as a lining for floors it has the double advantage of being sound-proof and non-conducting.

MINE RUN, Campaign of: on Nov. 7 and 8, 1863, Gen. Meade crossed the Rappahannock at Kelley's Ford and Rappahannock Station and concentrated his army of 70,000 men in the vicinity of Brandy Station, Gen. Lee, with 50,000 men, withdrawing beyond the Rapidan to an intrenched line, the left of which covered some of the fords of the river, the right being perpendicular to it and extending to Bartlett's Mill on Mine Run. On Nov. 26, Meade began the Mine Run campaign by sending the First, Fifth, and Second corps to cross the Rapidan at Culpeper Mine and Germanna fords, and the Third and Sixth corps to cross at Jacob's Mill, all five corps to converge upon the old turnpike and the plank-road near Robertson's Tavern, both leading to Orange Court House, and turn the right of Lee's position. The Second corps reached Robertson's Tavern at 10 A.M. of the 27th to find itself in the presence of a considerable body of Ewell's corps which Lee had hastened there, and it was ordered to remain on the defensive, until the Third corps, followed by the Sixth, came up on the right. But the Third corps was delayed. Lee, on discovering Meade's movement, had promptly ordered Early, commanding

Ewell's corps, to move to the right. Part of his command had reached Robertson's Tavern and confronted the Second corps, and Johnson's division was moving in the same direction when it came into collision with the Third corps, on Payne's Farm, and a battle ensued, lasting until dark. The Union loss was 125 killed, 747 wounded, and 71 missing. Lee reported a Confederate loss of 545. The Second corps was severely engaged during the day, and advanced some distance beyond Robertson's Tavern. At night the First corps moved up to the support of the Second. The Fifth corps, which had supported Gregg's cavalry division in an engagement at Parker's store, on the Orange plank-road, was brought over to support the Second, and next morning the Third and Sixth corps came up on the right of the Second. On the 28th, Meade advanced to the attack, but on driving in the Confederate pickets it was found that Ewell's corps had fallen back. Pursuit was made, the Second corps in advance, and after a march of two miles Ewell was found in position on the west side of Mine Run. A. P. Hill had come up and formed on Ewell's right, covering the Orange plank-road. The line was very strong, and on it were 150 guns. It was after dark when the Second, Sixth, and First corps, with part of the Third, fronted this position. An examination of Lee's position convinced Meade that there was no probability of success in an attack in his immediate front, and he determined to send Gen. Warren, with his Second corps and a division of the Sixth, to feel for Lee's right flank and turn it if practicable. The 29th was spent in reconnoitering and demonstrations, while waiting for Warren's movement. Early in the morning of the 29th, Warren started from Robertson's Tavern, crossed over to the plank-road, drove in the skirmishers of A. P. Hill's corps, and late in the day came upon Hill's position across the road. Warren reported to Meade that the conditions were favorable for an attack, and personally assured him that he could carry everything before him. Meanwhile some of Sedgwick's division commanders had discovered weak points on Lee's left, no works being thrown up, and Meade ordered an attack for the morning of the 30th, the right and centre to open with artillery at 8 o'clock, at which time Warren was to make the main attack, and at 9 o'clock Sedgwick was to assault Lee's left with five divisions of the Fifth and Sixth corps. Two divisions of the Third corps were sent to Warren, thus increasing his command to six divisions of 26,000 men. The batteries on the right and centre opened a furious fire at 8 A.M. The skirmishers of the First and Third corps advanced across Mine Run and drove in those of the enemy, and Sedgwick was about to assault when Meade ordered him to desist. He had received a despatch from Warren advising against an attack on Lee's right, as it could not succeed. During the night of the 29th, Warren had made dispositions for an overwhelming assault, but on the morning of the 30th

he saw on the heights before him a line of strong works thrown up over night, well filled with infantry, and heavy batteries covering the slope up which it was necessary to charge, and therefore he deemed successful attack impossible. Meade rode over to Warren, who proved unchangeable in opinion, and Meade tried to arrange for an attack later in the day, but found it impracticable. The armies remained confronting each other that day and the next, and on the night of Dec. 1 Meade withdrew to his former position beyond the Rapidan. Lee followed part way on the 2d. The Union loss in the Mine Run campaign, Nov. 26 to Dec. 2, was 173 killed, 1,099 wounded, and 381 missing. The Confederate loss was 110 killed, 570 wounded, and 65 missing.

MINERSVILLE, *mī'nėrz-vĭl:* borough, in Schuylkill co., Pa.; on the west branch of the Schuylkill river, and on the Philadelphia & Reading and Lehigh Valley railroads; about 45 m. n. by e. of Harrisburg. It is situated in the hard coal region, and its chief industries are connected with mining and shipping coal. Some of its industrial establishments are machine shops, foundries, lumber and brick yards. Pop. (1910) 7,240.

MINERS, Western Federation of: an organization including all workers in and around mines, mills, and smelters, for the improvement of their industrial and social condition. The Federation opposes the truck system, child labor, contract labor, and the use of the injunction in strikes. The executive officers are a president, a treasurer, and a secretary; there is also an organizer for each district; and these officers constitute the executive board. The executive board must approve every strike before it receives the support of the union. Its official organ is the *Miners' Magazine.* It was organized in 1893, and took the lead in the organization of the American Labor Union, with which it is now affiliated.

MINERVA, n. *mĭn-ėr'va* [L. *Minerva*—from L. root *men;* Skr. *man,* to think]: in Roman mythology, goddess of wisdom; identified by the later Græcizing Romans with the Greek *Athene,* whom she greatly resembled, though, like all the old Latin divinities, which were abstractions, there was nothing anthropomorphic in what was told concerning her. The ancient Latin scholar and critic, Varro, regarded Minerva as the impersonation of divine thought—the plan of the material universe of which Jupiter was creator, and Juno representative: in this view, all that goes on among men, all that constitutes the development of human destiny (which is but the expression of the divine idea or intention), would be under her care. She was the patroness of arts, sciences, handicrafts, and inventions; and was invoked alike by poets, painters, teachers, physicians, and all kinds of craftsmen. She also guides heroes in war; and wise, bold and useful designs were ascribed to the inspiration of this virgin goddess.

Her oldest temple at Rome was that on the Capitol, but she had another on the Aventine. Her festival was in March, five days, 19th to 23d inclusive.

ATHENE, or PALLAS ATHENE, the Greek goddess corresponding to the Roman Minerva, was one of the few really grand *ethical* divinities of Greek mythology. Different accounts are given of her origin and parentage, probably from the jumbling together of local legends; but the best known, and in ancient times, the most orthodox version of the myth represented her as daughter of Zeus and Metis. Zeus, we are told, when he had attained supreme power after his victory over the Titans, chose for his first wife Metis (Wisdom); but being advised by both Uranus and Gæa (Heaven and Earth), he swallowed her when she was pregnant with Athene. When the time came that Athene should have been born, Zeus felt great pains in his head, and caused Hephæstus (Vulcan) to split it up with an axe, when the goddess sprang forth—fully armed, according to the later stories. Throwing aside the thick veil of anthropomorphism which conceals the significance of the Grecian myth, we may see in this account of Athene's parentage an effort to set forth a divine symbol of the combination of power and wisdom. Her father was the greatest, her mother the wisest of the gods. She is literally born of both, and so their qualities harmoniously blend in her. It is possible that the constant representation of her as a strictly maiden goddess, who had a *real*, and not merely a *prudish* antipathy to marriage, was meant to indicate that qualities like hers could not be mated, and that, because she was perfect, she was doomed to virginity. She was not, however, a cold, unfeeling divinity; on the contrary, she warmly and actively interested herself in the affairs of both gods and men. She sat at the right hand of Zeus, assisting him with her counsels; she helped him in his wars, and conquered Pallas and Encelados in the battles of the giants. She was the patroness of agriculture, invented the plow and rake, introduced the olive into Attica, and (in harmony with her character as the personification of active wisdom) taught men the use of almost all the implements of industry and art; and is said to have devised nearly all feminine employments. Philosophy, poetry, and oratory also were under her care. She was the protectress of the Athenian state, was believed to have instituted the court of justice on Mars' Hill (the Areiopagus). As a warlike divinity, she was thought to approve of those wars only which were undertaken for the public good, and conducted with prudence; and thus she was regarded as the protectress in battle of those heroes who were distinguished as well for wisdom as valor. In the Trojan wars, she favored the Greeks—who, in fact, were in the right. Her worship was universal in Greece, and representations of her in statues, busts, coins, reliefs, and vase-paintings were and are numerous. She is always clad, generally in a Spartan tunic, with a cloak over it,

and wears a helmet, beautifully adorned with figures of different animals, the ægis, the round Argolic shield, a lance, etc. Her countenance is beautiful, earnest, and thoughtful, and the whole figure majestic.

MINERVA-PRESS, n. *mĭn-ĕr'va-prĕs:* in *bibliog.*, name of a printing-press formerly in London; also a series of ultra-sentimental novels issued from this press at the close of the 18th and the beginning of the 19th century.

MINERVINO, *mē-nĕr-vē'nō:* town of s. Italy, province of Bari, called the *Balcony of Puglia*, from the extensive view it commands of several cities. It stands on a fine hill, and has excellent air. Pop. (1881) 15,163.

MINES, in Law: mineral deposits as affected by governmental provisions as to ownership, claims, etc. In England the crown has the right to all M. of gold and silver; but where these metals are found in M. of tin, copper, iron, or other base metal, then the crown has the right to take the ore only at a price fixed by statute. As a general rule, whoever is owner of freehold land, has a right to all the M. underneath the surface, for his absolute ownership extends to the centre of the earth. When the land is given by will or otherwise to a tenant for life, while a third party has the reversion, then the tenant for life is held not entitled to open M. which have never before been opened, but he may carry on such as have been open. So in lease of lands for agricultural purposes, if nothing is said as to M., the tenant is not entitled to open any M., for that would be committing waste. It is not uncommon for one person to be owner of the surface of the land, and another to be owner of the M. beneath; or several persons may be owners of different kinds of M. lying above each other in different strata. The courts have determined that even though the owner of the land whose surface has been sold to a railway, reserve his right to minerals, he is nevertheless prevented by common law from working the M. immediately under the railway in a manner to endanger its use.

In the United States, the royal charters to the colonies of Mass., R. I., Conn., Penn., Md., and Va., conveyed all M., but reserving to the crown one-fifth of all ores of gold and silver. The continental congress, 1785, reserved to the general govt. one-third of gold, silver, lead, and copper M.; but this regulation was not long operative. Since 1866, by law of congress, all public mineral lands are freely open to be explored and occupied, under due and necessary regulations, local or federal. A law passed 1872 covers all the important points as related to the general government; but the differing mining laws of various western states must be referred to respectively in each case of use and occupancy of mineral lands.

Recent acts of parliament insure the greater safety of persons working them, and prevent the employment of women and children. Owners of mines are prohibited

from employing any woman or boy under 10 years of age underground. Boys under 16 can be so employed only ten hours per day, and boys under 12 must attend school at certain times. No owner or worker of a mine or colliery is allowed to pay the wages of the men at any tavern, public-house, beer-shop, or place of entertainment, or any office or outhouse connected therewith. No person under 18 is to be employed at the entrance of any mine, to have charge of the steam-engine or windlass, or other machinery and tackle for letting down and bringing up the men. Inspectors are appointed by government for the express purpose of visiting mines, and seeing that the statutes are complied with.—In the United States, laws varying in details, but to the same general purport, have been enacted in the different states.

MINES, MILITARY: important department in military engineering, and formidable accessory in the attack and defense of fortresses. A military mine consists of a gallery of greater or less length, starting from some point of safety and extending under an opposing work, or under an area over which an attacking force must pass, and terminating in a chamber which, being stored with gunpowder, can be exploded at the critical moment. M. are of great use to the besiegers in the overthrow of ramparts and formation of a breach; the *countermines* of the besieged are equally serviceable in undermining the glacis over which the assaulting column must charge, and blowing them into the air, or in destroying batteries erected for breaching. But far above the actual mischief wrought by the mine—often very great—is its moral influence on the troops, especially on the assailants. The bravest soldiers, who advance without flinching to the very mouth of the cannon *which they see*, will hesitate to cross ground which they suppose to be undermined, and on which they may be dashed to destruction in a moment, without the power of averting the *unseen* danger. The first employment of M. was very ancient, and consisted merely in obtaining an entrance to the interior of towns by passing beneath the defenses; but this soon fell into disuse, the chances of success being merely those of introducing a body of men before the besieged discovered the mine. The next use occurred during the middle ages, and was more destructive. The miners went no further than beneath the wall, then diverged to either side, and undermined the wall, say for about 100 ft. During the process, the wall was sustained by timber-props; and these being ultimately set on fire, the wall fell; and the besiegers, who had awaited the opportunity, rushed in at the breach. This use of M. of *attack* necessitated those of *defense*, which obtained in mediæval times, and have ever since kept the name '*countermines*.' The earliest subterranean defense consisted of a gallery surrounding the fort in advance of the foot of the wall, and termed an 'envelope-gallery.' From this the garrison would push forward small branches or tributary galleries, whence they

could obtain warning of the approach of hostile miners, and by which also they succeeded, at times, in overthrowing the battering-rams or towers of the besiegers.

Two centuries appear to have elapsed between the introduction of gunpowder into European warfare and its application to subterranean operations. The first instance occurred 1503, at the siege of the Castello del' Uovo, in the Bay of Naples, which a French garrison had succeeded in holding for three years against the combined Spanish and Neapolitan forces. At length, a Spanish capt., Pedro Navarro, devised a gallery into the rock, which he stored with powder, whereof the explosion, hurling portions of the rock and many of the besieged into the sea, caused the immediate capture of the place. At once the use of M. of attack spread throughout Europe; and so irresistible were they soon considered, that it was not unusual for the besieger, after preparing his mine, to invite the besieged to inspect it, with the view of inducing the latter at once to surrender. Defense soon availed itself of the new power, and retaining the envelope-gallery as a base, ran small countermines in many directions, to ascertain by hearing the approach of the enemy's sappers—their work being audible, to a practiced ear, at a horizontal distance of 60 ft. Small charges were then exploded, which, without creating surface disturbance, blew in the approaching gallery, and buried the sappers in its ruins. Thus commenced a system of subterranean warfare, requiring the greatest risk and courage, in which the operator was in constant danger of being suffocated. Of course, in such a system, the balance of advantage lay with the besieged, who had ample opportunities, before the siege commenced, of completing his ramifications in every direction, and, if desirable, of revetting them with masonry, which much diminished the chance of being blown in; while the assailant, no longer able to cross the glacis by an open zigzag trench, was compelled to engage in a most uncertain subterranean advance. The French engineer Belidor, in the 18th c., restored the advantage to the attack, by demonstrating that the explosion of a very large mass of powder in a mine which had not yet entered the labyrinth of defensive M., effected the destruction of the latter for a great space round, clearing the way with certainty for the hostile advance. Besides M. for explosion, tunnels are often dug as means of communication between different works, or between different parts of the same work, some being of size sufficient to permit the passage of four men abreast, of horses, and of artillery.

M. are either vertical—when they are called *shafts*—horizontal, or inclined, in either of which cases, they are *galleries*, the word 'ascending' or 'descending' being added, if there be inclination. The dimensions range from the 'great gallery,' six ft. six inches by seven ft., to the 'small branch'—the last diminutive of the gallery—which has but two ft. six inches height, with a breadth of two ft. The most frequent work is the 'common gal-

lery,' four ft. six inches by three ft., which is considered the easiest for the miner.

The sapper's tools are numerous, but most in request are his shovel, pickaxe, and above all, his 'push-pick' (see fig. 1); he has besides a barrow, a small wagon, a lamp, and other accessories. As he advances, it is necessary to line his gallery, always at the top, and almost always at the sides. This he does either by frames—which resemble door-frames, and serve to retain horizontal planks or 'sheeting' in position against the earth—or by cases somewhat resembling packing-cases, of little depth, which are used to form the sides and top. With cases, galleries are supposed to advance one ft. and a half per hour; while with frames, the progress is barely more than half that amount.

Fig. 1—Push-pick: Length, 1 ft. 10 in.

When a mine is exploded, the circular opening on the surface is called the *crater;* the *line of least resistance* is the perpendicular from the charge to the surface; the half-diameter of the crater is its radius; and the *radius of explosion* is a line from the charge to the edge of the crater, on the hypothenuse of the triangle, the revolution of which would form the cone. When the diameter equals the line of least resistance, the crater is called a one-lined crater; when it doubles that line, a two-lined crater; and so on. The common mine for ordinary oper-

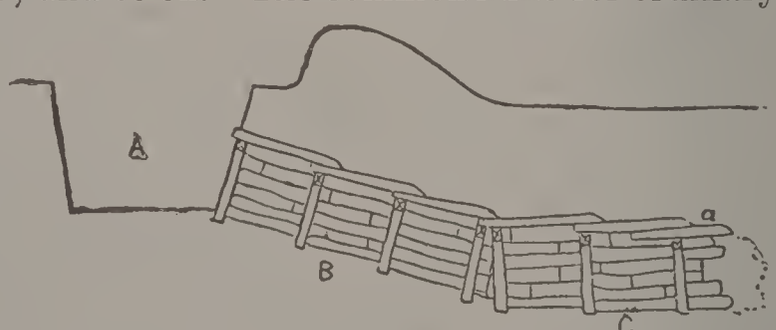


Fig. 2.—Mine supported by Frames, in process of construction from a Trench:

A, trench; B, descending gallery; C, gallery; *a*, roofing plank not yet pushed out to its full length.

ations is the two-lined crater; and for this the charge of powder should—in ground of average weight and tenacity—be in lbs. a number equal to one-tenth of the cube of the line of least resistance in ft.; e.g., at a depth of 18 ft., the charge should consist of 583 lbs. In sur-charged M., or globes of compression, as introduced by Belidor, vastly greater charges are employed, and craters of six lines are sometimes produced. The rules, in these cases, for computing the charges vary exceedingly, according to different engineers, and in every case are very complicated. Previous to the explosion, the gallery is filled up behind the charge, or *tamped*, with earth, sand-bags, etc., to prevent the force of the powder wasting itself in the mine. This tamping must extend backward for one

and a half or twice the length of the line of least resistance. The mine is fired usually by means of a powder-hose, composed of strong linen inclosed in a wooden pipe laid carefully through the tamping, or by wires from a voltaic battery.

In the annexed figure (fig. 3), is shown a system of countermines. The magistral gallery, AAA, is immediately within the wall of the counterscarp, through orifices in which it derives light and air, and by its loop-holes, the defenders can take in rear any enemy who might obtain momentary possession of the ditch. Farther in advance, and reached by galleries of communication B, is the envelope-gallery C, from which radiate the listeners D, D. To prevent the enemy's advances, these

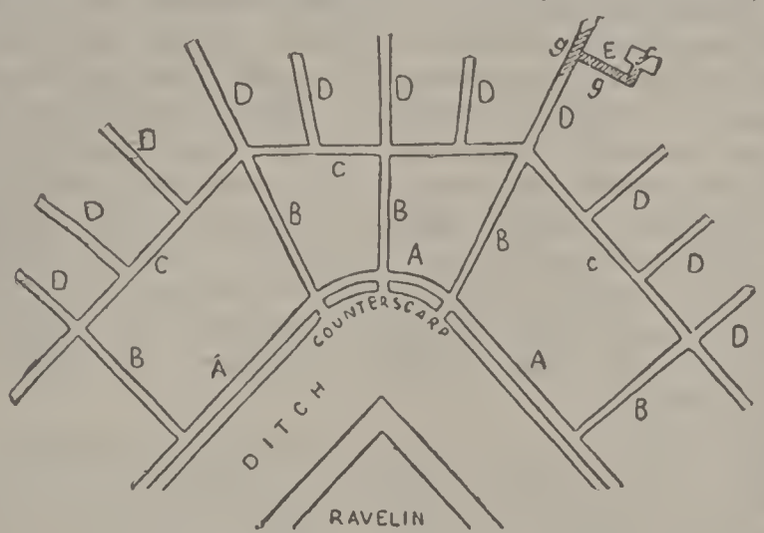


Fig. 3.—System of Countermines:

AAA, magistral gallery; BBB, galleries of communication; CCC, envelope-gallery; DDD, listeners; E, branch ending in chamber *f*.

listeners should not be more than about 54 ft. apart. Besides listening, they are used for aggressive purposes, such as driving branches and blowing in or up hostile works. Modern engineers object to the envelope-gallery, as affording too good a base to the enemy, should he obtain possession of it; and either dispense with it altogether, or merely retain it in short sections. At suitable points among the M., small magazines for tools and powder are formed; and at about every 30 yards, loop-holed doors of great strength are made, to stop the advance of an enemy, should he break into the galleries. In the course of their excavations, hostile miners frequently meet, or approach within a few feet: it becomes, then, merely a question of time which shall destroy the other; shells, pistols, pikes, and petards, as well as small mines, being used with murderous effect.

Provision is made for pumping foul air out of mines; but such military works are in general badly ventilated.

MINEVER, n. *mĭn'ĕ-vėr* [OF. *menuver*, a grayish fur: F. *menu*, small; *vair*, a kind of fur]: an animal, a variety of the ermine; its fur, which, in the middle ages, lined the robes of noblemen; also said to be fur obtained from a squirrel; spelt also MENIVER and MINIVER.

MINGHETTI, *mēn-gĕt'tē,* Cavaliere Marco: Italian writer and statesman: b. Bologna, 1818, Nov. 8; d. Rome, 1886, Dec. 10; of an opulent commercial family. Having finished his studies, he travelled, closely investigating the political, social, and economical institutions of France, Germany, and especially Britain. Returning, he published an essay advocating the free-trade views of Richard Cobden. In 1846, Minghetti opened his political career by starting a journal of liberal tendencies, soon after Pius IX. became pope; in 1847, he was elected member of the *Consulta delle Finanze,* and in 1848 became minister of public works. Having speedily lost faith in public progress under the papacy, Minghetti withdrew from office, and joined the army of Charles Albert in Lombardy, where he was appointed captain. After the battle of Goito, he was promoted major; and for his bravery at Custoza, he received from the king the cross of the Knights of St. Maurizio. After the war, Minghetti gained the confidence of Cavour, and subsequently became secretary for foreign affairs, resigning with Cavour on the peace of Villafranca. Minghetti became minister of the interior 1860, premier 1863, ambassador to London 1868, and was again premier 1873-76. His chief works are *Della Economia pubblica* (1859); *La Chiesa e lo Stato* (1878).

MINGLE, v. *mĭng'gl* [Dut. *mengelen,* to mingle—from *mengen,* to mix: Icel. *menga,* to mingle: Ger. *mengen;* AS. *mengian;* Gr. *mignucin,* to mix]: to unite into one body by mixing; to mix; to blend; to join in mutual intercourse or in society. Min'gling, imp. *-glĭng.* Mingled, pp. *mĭng'gld.* Min'gledly, ad. *-gld-lĭ.* Min'gler, n. *-glẽr,* one who mingles. Mingle-mangle, a medley; a hotch-potch.

MINGRELIA, *mĭn-grē'lĭ-a:* former principality of Transcaucasia, corresponding to anc. Colchis (q.v.); on the Black Sea. It was formerly a part of Georgia, and later was under its own princes; but since 1867 has been included in the govt. of Kutais, Russia. It is mountainous and forest-covered, with valuable mineral deposits.

MINGRELIAN, n. *mĭn-grē'lĭ-an:* native or inhabitant of Mingrelia. In *chh. hist.,* Greek Christians, natives of Mingrelia, a part of Old Georgia, and followers of Cyrillus and Methodius. They do not baptize their children till the 8th year, and observe other peculiarities of ritual and discipline.

MINHO, *mēn'yō* (Span. *Miño,* anc. *Minius*): river of Spain and Portugal, rising in the n.e. of Galicia, lat. about 43° 20′ n., long. about 7° 15′ w. Its course is s.w. through the modern Spanish provinces Lugo and Orense, after which it forms the n. boundary of the Portuguese province of Minho, and empties into the Atlantic Ocean. Its length, exclusive of windings, is 130 m., and it is navigable for small craft 23 m. above its mouth.

MINIATURE, n. *mĭn'ĭ-tūr* [F. *miniature*—from It. *miniatura*, a miniature—from L. *minĭātus*, colored with *minium* or red-lead, as the ornaments of MSS.]: any minute picture; a portrait of small dimensions; a name usually applied to portraits painted on a very small scale on ivory, etc., and in water-colors; red letter: ADJ. on a very small compass; minute.

MINIATURE PAINTING: while there seems to be no reasonable doubt but that the name *miniature*, as applied to small painted portraits, is a corrupt evolution and not, as commonly stated, a derivation from the Latin *minium* or red lead, with which the initial letters of ancient manuscripts were written, miniatures, as we understand them to-day, were known centuries before the red-lead initial letter was ever used. From the simple initial letter there was developed the superb illuminated manuscripts, where the initial letters were frequently embellished with portraits, and among these, especially the religious Book of Hours, of which there are many different ones, are some of the most exquisite paintings done by the hand of man at any period in the history of art. But far back in ancient days, long before illuminated missals or red-lead initials, miniature pictures and portraits were made, but by what name they were called, if any, has not come down to us. We find them on the oldest of Egyptian papyri, made about 2000 B.C.; on Greek vases of a later period and so on without intermission down to the detached painting in little on skin, metal, paper or bone that we know as miniatures, a term that defines itself, as every one understands what one means by the simple use of the word, and it is to these latter, almost exclusively portraits, that our attention is directed.

The transition from the illuminated mediæval manuscripts on vellum to the detached portrait on the same material, then on metal plates of copper, silver and sometimes gold, followed by paper or card-board and finally ivory, the material best of all suited to the purpose, was rather more sudden than gradual, albeit the school of modern miniature painting is derived directly from the scholastic miniaturists; and Britain may lay claim to the foundation of the first and best school of miniature painting proper. As slow as she was in the development of the arts generally, she was first and foremost in this department and has always maintained her supremacy, even though it were a German who was the first English miniature painter. To Hans Holbein (1497-1543), a native of Augsburg, is due the honor of introducing the art of portrait miniature painting into England and with such success that she has since retained an almost exclusive pre-eminence in the art. To such a degree is this true that the art of portrait miniature may be considered in some ways exclusively an English art. Its greatest exponents have been Englishmen, whose works while "limned in little" bear comparison with the greatest portraits of the world. Al-

though Holbein was a foreigner he did his best work in England and of English subjects, so that he has become to be looked upon as an English artist. He visited England first in 1526 for two years, returning in 1531 and remaining until his death by the plague. It was during his second visit that he began painting miniatures on vellum in gouach, the same medium as was employed by the earlier illuminators; but his portraits were on such broad lines that they would lose nothing by being enlarged to life size. Holbein was succeeded by Nicholas Hilliard (1537-1619) who was a goldsmith and jeweller as well as miniature painter and was employed by Queen Elizabeth and James I. He was fond of detail and his work is very decorative and minute in execution. He wrote the first treatise in English on miniature painting which still remains in manuscript. He was followed by the Olivers, father and son, Isaac (1556-1617) and Peter (1601-1647), both of whose work is important artistically as well as historically, and with them the traditions of the illuminators may be said to have passed away.

Under the influence of Van Dyck was developed the greatest epoch in the art of miniature portrait painting with John Hoskins (1590-1664) and his nephew, Samuel Cooper (1609-1672), in the lead, the latter being easily first of all miniature painters of any land and of all time. He excelled his predecessors and contemporaries and has never been equalled by any miniaturist since, far less surpassed. His art contains the finest qualities possible in the miniature portrait: character, expression, breadth, vigor, and solidity, combined with masterly balance of light and shade, simplicity and dignity of color and graceful treatment. He was followed by Thomas Flatman (1637-1688), Nathaniel Dixon (1640-1690), Laurence Crosse (1650-1724), and Bernard Lens (1682-1740), artists of note in their work, with some others of less importance. The year of Lens' death or possibly the next year saw the birth of Richard Cosway, (d. 1821) undoubtedly the best known name in the whole catalogue of miniature painters and unqualifiedly a great artist, but not entitled to the supreme place in which he is most frequently figured. There are more forged miniatures after Cosway and more attributed to him that he did not paint than all other miniature painters combined.

Ozias Humphrey (1742-1810) was one of the most charming miniature painters of the 18th century, whose proper place in the history of the art is next to Cooper, because of his characterization, breadth of handling and atmospheric qualities of tone and color; John Smart (1741-1811), Samuel Shelley (1750-1808), George Englehart (1752-1839), Andrew Plimer (1763-1837), Nathaniel Plimer (1757-1822), Henry Edridge (1769-1821), Andrew Robertson (1777-1845), William John Newton (1785-1869), and William Charles Ross (1794-1860) close the school of true miniature painters and are all important names of men who were eminent in the history of English miniature painting.

Of other countries there were in France, Francois Clouet, often called Janet, (1516-1570) who painted what is claimed to be the only authentic portrait of Mary, Queen of Scots; Pierre Adolph Hall (1736-1793) who, a Swede by birth, is the greatest miniature painter of the French school; Luc Sicard (1746-1825), Jean Baptiste Augustin (1759-1834), Jean Guerin (1760-1836), Jean Baptiste Isabey (1767-1855), Daniel Saint (1778-1847), and the last but by no means the least L. Mansion, who published a little book on his art. In Germany, Heinrich Friedrich Fuger (1751-1818) stands almost alone as a notable painter in little. In Italy, Rosalba Carriera (1675-1757) carries the palm, while Pompeio Battoni (1708-1787) and Guiseppi Longhi (1766-1831), the latter better known as a master of engraving, were skilled in their art. But any sketch of miniature painting would be sorely incomplete without a reference to what America has done in that delightful field of art, and it is not too much to say that, next to the mother country, America has produced the best miniature painters, if true art be placed before mere mechanical dexterity of manipulation.

There were painters in little in the early colonial days whose works have survived and do them no discredit, while their names are lost. But among American miniature painters who are well known and did good work are John Singleton Copley (1735-1815), Charles Willson Peale (1741-1827), James Peale (1749-1831), Henry Bembridge (1750-1820), John Trumbull (1756-1843), who beautifully painted little portraits on wood in oil colors that are generally classed as cabinet pictures, but are as much miniatures as many painted on ivory and on paper; John Ramage (d. 1802), Robert Fulton (1765-1815), better known as an inventor than as a painter; Archibald Robertson (1765-1835), William Dunlap (1766-1839), Edward Greene Malbone (1777-1807), easily first in his art in this country and at his best the peer of any miniature painter since Cooper; Robert Field (d. 1819), Benjamin Trott (d. 1837), Charles Fraser (1782-1860), Thomas S. Cummings (1804-1894), George H. Cushman (1814-1876), and Richard M. Staigg (1817-1881), who was the last here to practice the true art of the painter in little. The camera has taken the place of the brush, and miniature painting, as practiced down to the middle of the last century, unfortunately must be relegated to the lost arts. Within the last decade or more its revival has been attempted, but the best of these revivals are no better than painted photographs, which most of them really are, or large pictures painted in small size. They absolutely lack the distinction, the feeling, the technical excellence, the color, and the atmosphere that make the true miniature so attractive, so charming, and so lovable. For miniatures in enamel, see ENAMELS.

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and their Work (1898); Proport, *History of Miniature Art* (London 1887); Russell, *Art of Miniature* (1878); Wagner, *Miniature Painting* (1876); Williamson, *Portrait Miniatures from Holbein to Ross* (London 1897). The following works will also be found valuable in connection with the history of miniature painting: J. O. Westwood, *Faesimiles of the Miniatures and Ornaments of the Anglo-Saxon and Irish Manuscripts* (London 1868), a work which, in its special branch, has never been replaced; the handbook in the French series of Quantin, Lecoy de la Marche, *Les Manuscrits et la Miniature* (Paris 1884); and the general historical work by J. Labarte, *Histoire des Arts Industriels* (Paris 1866).

MINIÉ, *mĭn'e*, F. *mē-nē-ā'*, CLAUDE ÉTIENNE: soldier 1804, Feb. 12—1879, Dec. 14; b. Paris. He enlisted in the Fr. army 1821; served several campaigns in Algeria; became capt. 1849; was much engaged with study of gun and ammunition improvements, and might have lost his place in the service but for support of the Duke de Montpensier. He was a chief of battalion 1852-57. The Minié rifle-ball he invented 1849, but took no patent. It was used by the Eng. army at Inkermann, but not by the Fr. until after the Crimean war. It is a cylinder, conical in front, hollow behind, and with a slight ridge of metal, which pressure of firing forces into the grooves of the gun barrel, causing a flight of the ball of much increased range and precision. Capt. Minié came to America, 1869, to take charge of the Remington gun factory: but later accepted an appointment to take charge of a school of gunnery and manufactory of arms in Cairo, Egypt. See RIFLED ARMS.

MINIFIE, WILLIAM: 1805, Aug. 14—1880, Oct. 24; b. Devonshire, England: author. He was educated for an architect; came to the United States and opened an architectural and book-selling establishment in Baltimore 1828; was many years curator of the Maryland Acad. of Sciences, and prof. of drawing in the Maryland Institute Schools of Art; and published *Text-book of Mechanical Drawing* (1849); *Text-book of Geometrical Drawing; Perspective and Shadows* (1853); *Essay on the Theory and Application of Color* (1854); and *Popular Lectures on Drawing and Design* (1854).

MINIKIN, n. *mĭn'ĭ-kĭn* [Dut. *minnekyn*, a Cupid, dim. of *minne*, love: AS. *miniecn*, a nun, a minikin—from *menen*, a damsel]: a favorite; a darling: ADJ. diminutive; small.

MINIM, n. *mĭn'ĭm* [F. *minime*, extremely small—from L. *minĭmum*, the least: It. *minimo*]: in *music*, a note of the value of half a semibreve: the smallest liquid measure, about equal to one drop. MINIMUM, n. *mĭn'ĭ-mŭm*, the least quantity or degree; the opposite of *maximum;* a dwarf. MINIMIZE, v. *mĭn'ĭ-mīz*, to reduce to the smallest quantity or proportion possible. MIN'IMIZING, imp. MIN'IMIZED, pp. *-īzd.*

MINIMS, *min'imz* [Lat. *Fratres Minimi*, Least Brethren, so called, in token of still greater humility, by contrast with the *Fratres Minores*, or Lesser Brethren of St. Francis of Assisi (q.v.)]: order of the Rom. Cath. Church, founded about the middle of the 15th c. by another St. Francis, native of Paula, a small town of Calabria. Francis had, as a boy, entered the Franciscan order; but the austerities of that rule failed to satisfy his ardor; and on his return from a pilgrimage to Rome and Assisi, he founded, 1453, an assoc. of Hermits of St. Francis, who lived first in separate cells, but eventually were united in the conventual life 1474, and were established in several places in Calabria and Sicily. Francis was invited into France by Louis XI., and founded houses of his order at Amboise and at Plessis-les-Tours. In Spain, the brethren took the name of 'Fathers of Victory,' in memory of the recovery of Malaga from the Moors, which was ascribed to their prayers. It was not till very near the close of the life of Francis that he drew up the rule of his order. It is exceedingly austere, the brethren being debarred the use not only of meat, but of eggs, butter, cheese, and milk. Notwithstanding its severity, this institute attained considerable success; its houses, soon after the death of Francis (1502), numbering no fewer than 450. It has reckoned several distinguished scholars among its members; but in latter times, the order has fallen into decay, being now limited to a few houses in Italy, the chief of which is at Rome. The superiors of convents in this order are called by the singular name *Corrector*, the general being styled *Generalis Corrector*. A corresponding order of women had its origin about the same time, but also has fallen into disuse.

MINING: the occupation of obtaining useful mineral substances from veins, beds, rock masses or reservoirs. Success in the work is rendered more probable by a knowledge of the character and nature of minerals, such as is set forth in mineralogy (q.v.); acquaintance with the chief facts of geology (q.v.); an understanding of economic geology; and a good foundation in the principles of chemistry, physics, and mathematics.

While the industry had a simple beginning in the remote ages when men washed gravels for gold or precious stones, it is now a well developed business calling for the investment of much capital, the use of extensive machinery, and the employment of men trained in various sciences. The geologist, assayer, civil engineer, electrical engineer, mining engineer, and metallurgist, all find in the business problems that call upon their highest knowledge and skill.

The substances most generally sought are such metals as gold, silver, platinum, copper, iron, lead, zinc, tin, quicksilver, antimony, bismuth, aluminum; and such nonmetals as coal, gas, oil, building stone, precious stones,

pigments, abrasive materials, clays and other substances used in the arts and manufactures.

One wishing to mine must first find a favorable location. While hunting, he is called a *prospector.* He may stumble upon his *prospect,* as has many a sheep herder or stage driver or 'grub-stake prospector.' He may be a rule-of-thumb man or one well educated in all the sciences involved. Of two men equally keen of sight, rugged, and persistent, the better educated will have by far the greatest chances for success, although the self-styled 'practical' man usually states otherwise. Old-timers washing for gold threw away a pile of 'troublesome blue stuff' before a mineralogist came, who recognized that the 'blue stuff' was argentite and took steps which led to the development of the fabulous wealth of the Comstock lode (Nevada). Chance figures largely in the finding of a mine; expert knowledge in its recognition.

The prospector notices the character of the rock. For example, if searching for gold, he may follow up a stream bed, from time to time putting a few shovelfuls of gravel into his pan—a sheet-iron pan about a foot and a half in diameter, about three inches deep, with flat bottom and sloping sides. Holding this pan under the water, he shakes and gently rotates it till all the gravel has run over the side, leaving any gold which may be present in the bottom of the pan. Mining alluvial gold by *panning* is possible, inasmuch as ordinary gravel has a specific gravity of about three, while gold is at least six times as heavy as the other materials in the pan (Sp. G. is 19).

While panning gives the prospector for gold good service, a progressive miner soon employs better implements. The prospector next endeavors to trace the gold up stream, and, if possible, to locate the *lode* from which it was derived. When searching across country he looks for contact of metamorphic with igneous or sedimentary rock. Outcrops of rock aid him, and when the rock is covered by surface soil the growth of certain vegetation may enable him to follow certain formations. Yucca grows best on granitic rock, while the ocotilla is confined almost exclusively to clay slates, so that it often appears as if a fence were dividing them. Elderberry bushes, whose white blossoms can be distinguished from afar, require water and hence grow on the rim of bed rock rather than on gravels. Springs, also, are a useful guide. Further, the contour of the country is to be closely observed. Quartz veins being resistant to both chemical and physical agencies often stand out above the surface, forming a wall extending for miles across the country. In Australia the miners call them reefs. A depression or trench may be formed by a vein whose chief constituent (lode stuff) is calcite, pyrite, kaolin, or another non-resistant substance. Attention is paid to the *dip, strike, faulting,* and other structural features of the rocks, as

well as to their petrographical characters. All of the precious metals are found most commonly at contact with igneous and metamorphic rocks. Non-oxidizable metals like gold and platinum, minerals like cassiterite, monazite, diamonds, rubies, zircon, and so forth, are found in gravels derived from igneous and metamorphic rocks. Platinum is found in connection with serpentine; lead and zinc, in limestones and metamorphic rocks; copper, in melaphyre, and associated with precious metals in the classes of rocks above mentioned; quicksilver, in metamorphic limestone; tin, in granite; iron, widely disseminated in all these classes of rocks.

After the presence of precious metal has been detected the next question is as to its quantity and value. Samples are taken from as wide an area as possible and under varying conditions and are assayed. In taking such samples the assayer has to guard against the deceptions of man and nature—one deception is just as much to be feared and guarded against as the other. 'Salting' a mine by would-be sellers is a common occurrence. About 25 years ago a company of swindlers bought rough diamonds and scattered them in a likely locality in Arizona and then led out a party of capitalists who picked up the diamonds and thereupon invested several hundred thousand dollars. Gold mines are favorites with 'salters.' A crude method is to shoot fine gold into an ore face from a shotgun or to paint a portion of a vein with chloride or cyanide of gold. The writer has received from promoters for assay samples of black sand containing gold shavings—the salting being so crude that the shavings still retained the milling marks of the coin. Other samples had gold fastened to the quartz with pine-tree gum, so smeared over as to be almost unnoticeable.

Measuring the prospect in former times was more difficult than at present. Then it was usually necessary to sink shafts and dig level tunnels before reliable estimates could be made. Now it is often possible to size up the ore body by the use of diamond or other drills. When soft rocks are to be drilled, a rotary drill is most advantageous. In harder rocks a blow is given by a drill suspended from a stiff rod, jointed rod, or a rope. The drill tool may be of the churn, shot, or diamond drill type. The latter is best where the rocks are homogeneous and hard.

Great care should be exercised in finding length, breadth and depth, in order to avoid inaccuracies and misrepresentation. Drills, narrow trenches, and excavations may all be necessary to draw safe conclusions as to the promise of the ore body. Sulfids decompose, the lighter materials wash away, producing a concentration, and oxidation often enriches the surfacial deposits. For example, chalcopyrite ($CuFeS_2$) oxidizes to cuprite (Cu_2O), which is richer than the original. The prospector should consider not only the ore body but the means for

development. Water and wood are as necessary as ore. Fuel for running the machinery is required. Transportation for machinery and supplies for the workmen and for the outgoing ore are absolute necessities. A large body of low-grade ore is more to be desired than a small vein of exceeding richness. The next step after locating, assaying, and measuring is *developing*. The method employed depends upon the nature of the deposit. Bedded deposits, or those in veins, require different working than do superficial and disseminated deposits.

Gold in gravels may be washed in a cradle, or a reservoir may be built, the water led from it by a flume, through pipes with sufficient fall to furnish a good head and then, by means of a giant nozzle played upon the gravel bank, tearing up the mass and washing the gravel through sluice boxes. In the bottom of these boxes cross cleats of wood have been fastened and behind them the gold collects. This is called *hydraulic* or *placer mining*.

Bedded deposits are often worked in open day by simply quarrying, as in the Mesabi iron mines, in many kaolin, gypsum, tripoli, and at many lead and zinc mines, and in the Kimberly diamond mines in the early days of the industry. When preliminary stripping is required it is often done by means of steam shovels.

Veins and the majority of deposits usually require the sinking of *shafts*, driving of *tunnels, cross cuts, ore chutes, gang-ways*, etc., at different levels; extensive timbering, the use of powerful hoisting, pumping and ventilating machinery.

Shafts may be vertical or inclined. The latter are more usual in coal mines where tunnels are inexpedient, and the former in metal mining. Shafts are commonly seven to twelve feet square, well-like excavations, fitted with timbers when passing through soft materials and extending often to great depths. In the Lake Superior copper mines they have reached nearly 5,000 feet in depth. In Cornwall and in the Harz mining regions, and in southern Africa mines have been carried to great depths. The building of a shaft may cost from $50,000 to $250,000. In early days, and unfortunately still in many mines, the miners ascend and descend laboriously by means of ladders. The ladders, 25 feet long, extend from one platform to the next. In the top of the platform is a circular opening, through which the miner passes to begin the ascent of the next ladder above. Some mines are half a mile in depth and it requires an hour for the weary miner to reach the surface from his work in the lowest diggings. In other mines the miners make use of buckets suspended by ropes to a windlass turned by man, and the ores are handled in the same manner. In some well-equipped mines are the so-called 'man engines,' where long shafts furnished with platforms at different levels are alternately raised and lowered for short, appropriate distances past each other. The miners, wishing to de-

scend, step from one platform to the other at the right moment and are thus carried down. More general is the employment in well developed mines of tubs and cages attached to round or flat steel cables fastened to a drum controlled by powerful engines. These convey the workers up or down with startling rapidity. While descending, say to a thousand foot level, the speed is so great that, as it is slackened at the approach to the desired level, it seems to the visitor that he has begun to ascend. Enormous quantities of ores are handled in the course of a day in well equipped shafts. In many districts the law requires that every mine shall be provided with two shafts at least. Through the shafts are run, also, pipes for drainage, for ventilation, for conveying compressed air, and electric wiring, for driving drills and lighting purposes.

From the shafts at various depths horizontal tunnels or *drifts* are run. In the Kimberly mines they are every 40 feet apart, in our western mines from 50 to 100 feet. Through them the ore is hauled to the shafts. From the tunnels, which are commonly parallel to the vein *cross-cuts* to the vein are driven. From one drift or cross-cut to the next below, *ore chutes* are dug in order that the ore may be dropped into cars, the miner preferring to handle the ore by gravity rather than by lifting power. In various places, generally on the vein, running from one level to another, small shafts called *winzes* are excavated for purposes of ventilation.

If a view of all the different workings of a well developed mine could be obtained at once it would appear like a series of ground plans of a city, with streets at right angles to each other, each level representing a different group of streets and each connected with those above and below with numerous shafts.

Ore is excavated or *stoped* at the ends of the drifts. If the rock be hard, as is usually the case in metal mines, holes are drilled with hand drills, or, better, with electric or compressed air. Hand drills are still used in mines not well financed. Under some conditions the electric drills are advantageous, but for most purposes the compressed air drills are the best, since the air given off by them aids in ventilation and in lowering the temperature. The holes are charged with explosives like dynamite or giant powder and fired. After blasting the broken rock is roughly sorted by hand and loaded into tubs. One man can lift six tons five feet in ten hours. The tubs are hauled on trucks running on rails by men or mules or steam or electrical power to the shaft and carried up to the part of the mine which is above ground.

Drainage of a mine is aided by so choosing the entrance that the bottom of the shaft or the mouth of the tunnel are at the lowest point, and from thence the excavation is so made as to allow the water to flow through this lowest point. The depression at the bottom

of the shaft is called the *sump*. The water collecting in it is pumped out. In mines in backward communities, like the gem mines of Ceylon, of Penna, India, or the Ural mountains, or the 'poor man's mines' in the western United States, the water is hauled out in jars or pails by hand. In highly developed mines, like many in Australia, South Africa, Germany, England, Michigan, Missouri, Montana, Colorado, powerful pumps capable of raising millions of gallons daily are used and pour out a veritable river of water. A lack of water in a mine is a greater drawback than an excess, inasmuch as the workings above ground require a large quantity of water.

Attempts are often made to carry off excess water by other methods than by pumping. At the Comstock mine, Adolph Sutro excavated a tunnel nearly four miles long at a cost of nearly $2,000,000 for the purpose of draining the mine. And in Cornwall, a series of mines are drained by a tunnel nearly 30 miles long.

Ventilation is as necessary as any other provision on account of the poisonous gases and high temperatures which are often found in mines. *Fire damp* (carburetted hydrogen) and *choke-damp* (carbon dioxide) are especially common in coal mines. The former leads to deadly explosions and the latter extinguishes the lights of the miners and tends to suffocate the workers. In addition to these gases there are sulphuretted hydrogen, gases developed by the explosion of powder, and so forth. The temperature in these mines is often high because of the increase of heat with the increase of depth or because of the presence in the vicinity of igneous rocks not yet thoroughly cooled, or of hot waters. In the Comstock mine boiling waters were repeatedly encountered which, on one or two occasions killed the miners, but quite generally made the temperature so high that the men were unable to work more than half an hour before they became exhausted and had to be carried out.

Ventilation is often accomplished by digging an air shaft at the farthest end of the mine and lighting fires in the bottom of the shaft or placing fans so that the air coming in at the mouth of the tunnel is carried through and up the shaft in the manner of a chimney. Compressed air is often carried deep within the mine through pipes, borne along by the means of fans and controlled by doors properly placed. The most advantageous method is by suction in order that dangerous gases may be rarefied.

Timbering must be resorted to in all mines where the surrounding rock is not of sufficient firmness to keep open the shafts and tunnels. Throughout the west, in regions where forests are scarce, the matter of timbering is a serious question, involving great trouble and expense. It is said that in some mines the timber employed nearly equals in value the profit in the ore produced. In the United States in 1905 timber worth $16,455,887 was

used in mines. Falling roofs are one of the great sources of danger to the miner. When stoping at the end of a drift, a mud or water cavity may be tapped with destructive results. By explosions of carburetted hydrogen, by the oxidation of unstable sulphides, or by the flames from the lamps of careless miners destructive fires are often started and sweep through well timbered mines. Accidents often occur from the falling of machinery in the shafts.

Coal mining presents some problems different from those met with in metal mining. Since great quantities of cheap materials must be handled economically it is advantageous to open a coal mine by horizontal or slightly inclined tunnels. The presence of coal in new regions has often been detected by following the course of streams and noting the excavations in strata in position or by following the 'float.' After the location of a coal bearing stratum coal is usually expected wherever such strata outcrop. The use of the drill often enables the prospector to definitely mark off the boundaries of his mine. Four points are to be considered in opening such a mine. The entrance should be double, made at the lowest point accessible for transportation and the disposal of waste. Second, heavy pillars should be left at all points and especially near the entrance; third, there should be a carefully planned system of cross entrances; and fourth, great care should be exercised in providing substantial timbering.

In the best equipped mines compressed air drills and channelling machines are used. The mines are lighted by electricity and the cars are hauled by the same means. There are two methods commonly followed known as the *long wall,* where the excavation proceeds along a wall, the refuse material furnishing the support for the roof; and the room and pillar method, where chambers are excavated and where pillars are left in position until such time as the mine is about to be closed, when the pillars also are drawn and the roof is allowed to cave in. Unfortunately in many mines the best coal only is removed and the rest irretrievably buried. In addition to this waste of coal is that practiced in removal where millions of tons are slacked by exposure to air and water. It is estimated that at least one-quarter of all the coal removed is thrown away. Add to these two sources of waste that practiced in its use and it appears that not one-tenth of the full fuel value of coal is obtained. The dangers from gases are especially great in coal mines. At the Scott Mines, Pictou co., Canada, 1893, Aug. 8, lightning ran down a shaft and caused a fatal explosion. The cause of the explosion 1907, Dec. 6, at Monongah, W. Va., which cost the lives of 344 miners—the most destructive explosion that has occurred in the United States—is not known. The value of the coal mined in the United States exceeds that of any

other mineral. In 1906 it amounted to over $566,000,000.

The most productive coal mines of the United States are in Pennsylvania, West Virginia, Ohio, Indiana, Illinois, and Michigan. A geological section of almost any of these mines would show the following succession of strata from the top toward the bottom: limestone, sandstone, gray shale, coal, fire clay, shale sandstone and conglomerate—approximately the same strata repeating themselves for several different horizons.

The next product of the mines in value after coal in the United States is copper. Copper, gold, which ranks number five in value, and silver, which ranks ten, are mined and milled under quite similar conditions, since these metals usually occur together. The containing rocks are usually either igneous or metamorphic rocks penetrated by veins usually from a few inches to a yard in width, running toward any point of the compass and sometimes extending to great depth. At Keweenaw Point the copper mines have furnished greater masses and larger amounts of pure copper than have the mines of any other place in the world. The mines at Butte and in south central Arizona are the chief producers of copper sulphide and carbonates. At these localities and most generally in other localities also, gold and silver are associated with copper ore. All sulphides require preliminary roasting and smelting. Free milling ores, such as many gold ores, are first concentrated by pan, cradle, sluice-box, pointed box, Oregon Tom, or an inclined agitated board (called the *frame*, *tye*, or *buddle*) upon which the ore is fed. Usually the ore requires crushing in a crusher. It is then sent between rollers or pulverized under *stamps* until it becomes an impalpable dust, when it can be washed through a sieve which has 200 strands to the inch and is run over an *amalgamated plate*, carried onto a *jigger*, and finally distributed to various places by means of a corrugated rubber belt called a *vanner*.

The number of gold mines in the United States in 1906 that were producing ore and concerning which reports were handed into the United States government were 4,430. Of these, 1,125 were in Alaska, 1,007 in California, 600 in Colorado, and smaller numbers in many states, chiefly those west of the Mississippi river.

Colorado is the leading state in the production of gold, having produced over $25,000,000 in 1905, California over $19,000,000, Alaska more than $14,000,000, and South Dakota nearly $7,000,000. Twenty-one states and territories contain gold mines.

The next mineral in value of production is iron. The value of iron ore mined in 1906 was $107,000,000. If the value of the pig produced from this ore were considered it would place this mineral second in the list at $453,000,000. Such a ranking would hardly represent a

just comparison, inasmuch as the value of any product is naturally increased by the transformations through which it may be put in the manufactures. For example, iron ore has been produced in Minnesota (1897) as cheaply as 72 cents per ton. At that time pig iron was worth $12 per ton, steel rails $17 per ton, 1-in. screws $1,000 per ton, steel wire $3,000, sewing needles $7,000, fish hooks $20,000, watch jewel screws $3,000,000, watch hair springs $16,000,000.

Iron mines are found in the Archæan in the eastern United States, in the Precambrian in the Lake Superior district, in the Silurian in Missouri, the Carboniferous in the eastern United States, in the Tertiary in Arkansas and Texas.

The productive mines are in three main geographical regions in the United States: (1) the Appalachian region, embracing Pennsylvania, Virginia, Tennessee and Alabama as the most productive states, and where the ores are mostly non-Bessemer, inasmuch as they contain over 5 percent phosphorus; (2) the Lake Superior region, where the ores, chiefly hematite and magnetite, are of Bessemer quality. The mines of this district, especially of Michigan and Minnesota, are the most productive of any in the world. To the mines of Menominee, Marquette, Penokee-Gogebic, Vermillion, and Mesabi ranges is due the leading place which the United States holds in iron production in the world. (3) The western region embracing an extensive territory in Missouri, Texas, Colorado, and Oregon is as yet but slightly developed. Twenty-eight states contain iron mines.

The next mineral in value of production is clay, more than $161,000,000 worth of clay products having been produced in 1906. The amount of clay mined is rapidly increasing and the quality available is practically inexhaustible. As population becomes more crowded and greater inroads are made upon our limited supply of iron and wood for building purposes, the use of clay products will be enormously extended until the industry surpasses all others. Clay is found in all parts of the country.

Besides the above mentioned mineral products there were last year in the United States 20 other mineral substances mined, every one of which increased the wealth of the country by more than $1,000,000. Named in order of their value, they are: Petroleum, $84,000,000; stone, $63,000,000; gas, $46,000,000; lead, $39,000,000; silver, $37,000,000; cement, $35,000,000; zinc, $27,000,000; lime, $24,000,000; phosphate, rock, and sand, each, $12,000,000; mineral waters, salt, nickel, sulphur, each $6,000,000; slate and aluminum, each $5,000,000; gypsum, $3,000,000; antimony, quicksilver, borax and asphalt, each more than $1,000,000. Altogether, about 100 valuable mineral substances are mined, and in 1906 they increased the wealth of the United States by the enormous sum of $1,902,505,206, making the United States

by far the leading country in the world in mineral production. The substances mined are classified as fuels, metals, structural materials, abrasive, chemical, pigment, fictile, ornamental, and miscellaneous materials.

Among the metals, besides those described above, lead and silver are worthy of attention. Nearly equal amounts of these are produced yearly. In the Cordilleran region they occur together. No silver mine is more famous than the Comstock. In 14 years (1861-75) it yielded $169,000,000 worth of ore, 55 per cent. of the value of which was silver and 45 per cent. gold. During 5 years (1867-72) nearly $500,000 was spent in exploitation and development without any returns. In 1873 a mass of ore called the Great Bonanza was encountered and yielded ore worth $632 per ton, and thereafter the region yielded great amounts of the precious metals until 1878, when the miners were in *Borasca.* Since that time the Comstock lode has been intermittently mined but has yielded returns scarcely great enough to justify the expenditures involved. Utah, Idaho, Arizona, New Mexico, California, South Dakota, Michigan, and some of the eastern states have yielded silver ore in greater or less amounts. Mexico is the second country in the production of silver of the world. South America has long been a great producer. The Potosi mine in Bolivia at one time produced more than $9,000,000 worth of silver annually. In general, the South American mines produce native silver, while the United States and Mexican mines produce native silver and argentiferous galena, and European complex sulphides.

Large quantities of lead are produced in the Mississippi valley region, where the lead is associated with zinc. There are three chief regions in lead production in the United States: (1) the Appalachian, where the veins are in metamorphic rocks; (2) in the upper Mississippi region—Wisconsin, Iowa, and Illinois—where the mines are in horizontal limestone which contain the lead sulphide in flats and pitches; and (3) the Missouri, Kansas, Arkansas region, where the lead occurs chiefly disseminated, or bedded, in the Palæozoic limestone. Spain has the most productive lead mines, while the United States takes second rank, Germany and Mexico coming third and fourth.

The most productive zinc mines are found in Belgium, while the Siberian mines rank second, and those of the United States third.

Practically the only quicksilver mines in the United States are those that were opened up in California about the same time that gold was discovered there—a most fortunate occurrence, inasmuch as quicksilver is so essential to gold production. The quicksilver is united with sulphur to form the mineral cinnabar, although globules of the pure quicksilver are found in the same limestone that incloses the cinnabar.

Fifty-one states and territories in the United States

contribute to the mineral resources of the country. Pennsylvania adds more to the mineral wealth than any other three states; Ohio comes second; Illinois, third; West Virginia, fourth; Montana, fifth; New York, sixth; and Alabama, seventh.

South African and Australian mines have contributed enormously to the world's supply of precious metals. Nearly all portions of the earth's surface contain one or many mineral substances which may be utilized for man's profit. These resources are but awaiting knowledge, energy, and capital sufficient to transform them into useful substances. The work of the miner is one of the most worthy and honorable that can be performed and much of it has an enduring character; for example, the stones that are quarried for buildings, the gems that are mined for ornaments, and the gold which is dug for coin and objects of luxury, are not destroyed by one using, but endure for years and possibly for centuries to serve their function of utility or beauty.

Electricity in Mining.—Of late years the electric motor has been utilized for all classes of work—drilling, coal cutting, hoisting, pumping, ventilating, etc., increasing the output of the mine and reducing the cost of production. There are many economies resulting from the general flexibility and applicability of the electric system, making possible the centralization of the power generating plant, the laying out of the mine in the manner most conducive to economical working, the improvement of mine conditions, decrease in the number of men required to operate boilers, engines, pumps, blowers, etc., a reduction in the cost of repairs, the installation of hoists, blowers, or pumps at points where they would otherwise not be used on account of distance from the central power plant, the avoidance of the objectionable exhaust from steam engines, a saving in space requirements for machinery in general; and, finally, the provision of a safe, efficient, and economical means of lighting the mine.

The electric systems suitable for the operation of mining plants are as follows: (1) Direct current for haulage, power, and lighting. (2) Direct current for haulage, and polyphase alternating current for power and lighting. (3) Polyphase alternating current at high potential for power distribution to substations, where it is converted into direct current or to low potential alternating current, or both.

The first system is adapted to mines in which power is not transmitted a great distance. The generating station should contain two or more direct current dynamos connected according to either the two-wire or the three-wire system. If the three-wire system is used, it will be found advantageous to install the Westinghouse three-wire generator, which supplies direct current at two voltages, one twice the other; otherwise it will be necessary to have two machines always in operation, or some

more complicated form of balancing apparatus. The three-wire generator can be operated on the three-wire system in connection with other direct current machines of the ordinary two-wire type.

The second system is adapted to the same class of work, but embodies a further advantage, which is particularly important in the case of coal mines. The alternating-current induction motor with revolving secondary of the squirrel cage type has neither brushes, commutator, slip rings, nor other moving contacts, is, therefore, entirely sparkless, and its use involves no danger from explosion or fire. The absence of brushes or commutator is, moreover, an immense advantage where motors are intrusted to the care of unskilled labor and exposed to dust and dirt. The power plant for this system must necessarily contain either a direct-current dynamo to operate the haulage system and an alternator for the power and lighting, or a double-current machine which generates both direct and alternating current. If the amount of direct current required is relatively small, it may be advantageous to install alternating-current generators with a rotary converter or motor-generator to supply the direct current.

The third system is adapted to those cases where a large number of mines can be operated from one central power station. This plan greatly reduces the number of men required in the power plant, as well as the cost of buildings and apparatus. It also makes possible the utilization of water-power, thus doing away with steam boilers and firemen, and permitting inexpensive water-wheels to be substituted for costly steam engines. By the use of a high voltage, alternating current may be transmitted economically to almost any distance. At the mines it may be transformed into direct or alternating current of a voltage suitable and safe for the operation of mining machinery.

Electric Locomotives.—The saving effected by the use of electric locomotives in mine work is immense. The cost of maintenance is less than with any other system of traction, but the greatest saving, as compared with either animal or mechanical haulage, is in the cost of attendance. The compactness of the electric locomotive makes it perfectly adaptable to low and narrow entries. There are no moving parts exposed to external injury; the mechanism is of the simplest character and the running parts are easily accessible. It may be used upon temporary tracks and in crooked passageways where the installation of a rope-haul system would be impracticable. An electric locomotive may also be used to distribute the cars to room partings, work which with a rope system would require extra men and mules. For the hauling of slag to the dump it is the most economical and serviceable motor power.

Electric Hoists.—The great utility of the electric hoist in mining work is due to the ease with which the electric motor can be controlled and to the fact that an

electric hoist equipment requires little space and may be installed wherever needed. Electric distribution does away with many small boilers and engines, permitting the power plant to be consolidated under one roof. The types of motors most suitable for hoisting work are the direct-current series and compound-wound motors, and the alternating-current induction motor. The series motor is valuable if a very high starting torque is desirable, but close speed regulation is not required. If there is any possibility that the motor might race the compound-wound motor should be used. The compound-wound motor has the high starting torque of the series motor, but resembles the shunt motor in that it will not exceed a certain speed when the load is thrown off. A controller suitable for motors of this class consists of an iron box containing resistance, a commutator composed of a number of contact blocks, each of which is connected to the resistance at a suitable point, and a set of brushes mounted on a rocker arm. The direction of rotation of the motor depends upon the direction in which the controller handle is moved from the neutral point.

Compressed Air.—In many mines where electric-power distribution has been adopted, compressed air is still employed for the operation of small tools, drills, and coal cutters. In such cases, electric motors are used to drive the air compressors, which, in consequence, may be placed conveniently near the point of application of the air, thus avoiding long and complicated systems of piping. Both pumps and compressors require a practically constant torque, or turning moment, in the motor. The speed variation demanded is usually small. If power distribution is by direct current, motors should generally be compound wound, and, if necessary, the speed may be varied by means of a rheostat in the shunt field. The series winding prevents the heavy fluctuations of current that would take place in a simple shunt motor when passing through the different parts of the pump cycle. Where hydraulic pumps supply a long line of pipes, a series winding on the motor easily furnishes the heavy torque required for starting.

Electric Motors.—For the operation of fans and blowers, the electric motor has unequaled advantages. When properly constructed and installed it requires little attention and runs continuously day in and day out with only occasional cleaning and oiling. This point is especially important since it is often desirable to locate ventilating fans at unfrequented points and at considerable distances from the power-house. A point which sometimes may be of considerable importance where a large number of motors are located at widely separated points throughout a mine is that the alternating-current induction motor and the direct-current series and compound motors, will start and stop with the starting and shutting down of the main generators in the power-house. If by reason of an accident or other

cause the current supply is stopped, all the fans and other machinery in the mine may be started again promptly when the power is turned on without visiting the different points where the apparatus is located. This is a feature which might be of great importance in many instances. It is possible to start and stop the induction motor at any time from any distant point by simply opening or closing the main circuit. The series and compound motors may also be controlled easily from a distance.

In placer as well as in lode mining, electric power may be employed advantageously for pumping and for hoisting either direct or by derrick. It is essentially applicable to dredging apparatus, since it admits of the operation of dredges where fuel is hard to obtain or expensive, and makes possible the carrying on of the work at night.

Compressed-Air Mining Machinery.—Notwithstanding the widespread use of electricity in mine applications involving power, compressed air has many advantages in certain situations. In coal mining it is extensively employed. Fan engines, pumps, etc., can be driven with air without condensation losses, without trouble from dampness, and without fire risks, in connection with the machinery already in place, and perfectly understood by present employees or other labor obtainable anywhere. Rock shafts, rock roofs, tunnels and floors can be reduced to a power basis with great saving in time and cost. Air assists ventilation everywhere, clears away the smoke at once from a room or entry which must be pushed, drains the low spots, or pumps the heaviest floods with common pumps, requiring no more skillful handling than the most careless boy about the works is equal to, and all this beyond the possibility of being drowned out. Blacksmith fires and steam hammers are operated at the touch of the foot. Ventilation is assured in remote places, in case of a choked airway, or any restricted place. The air lines are laid throughout the mine, and the engine-room may be equipped with a powerful fire pump. Each air hose may then be used to carry a strong stream of water to the coal face at need, a pipe line being a factor of safety and not of risk. Compressed air, like electricity, has seen the time when, not being understood, it has been applied wastefully. Air is merely a transmitter of power, just as electricity or a wire rope is; but, correctly used, it is inherently economical, being practically a perfect gas. Important developments are continually being made, and the future promises much in the advancement of compressed-air appliances.

Signaling in Mines.—Effective signaling in mines requires a great variety of apparatus, such as telephones, telegraphs, bells, and appliances for sending signals according to the indications upon a dial. Of late years the telephone has advanced beyond other methods of signaling, and special types of instruments, intended for

mining work, are made with regard to conditions of exposure, damp, etc. It is generally recommended that telephones be put in all permanently installed motor-rooms, so as to enable the men in charge underground to inform the engineer at once of any breakdown of motors, machinery, etc., and, if necessary, obtain assistance speedily.

Ventilation and Drainage.—In the development and operation of extensive mining enterprises, ventilation and drainage are in many instances a source of expense and cause of numerous difficulties. The cumbersome and expensive Cornish pump system of mine drainage has in late years been largely displaced by modern steam, electric or hydraulic pumping engines, which have a greater efficiency and greatly decreased expense in first cost, as well as in operating expenses. The method of mine drainage by means of automatically operated skips has also been improved, and in some instances this method of mine drainage is preferred to any other mechanical means, though where the amount of water to be handled daily is very large a special shaft and hoisting equipment is desirable, if not necessary, in order to admit of the product of the mine as well as materials and men being handled. The means of ventilation have also been improved over old practice by the introduction of large and better ventilating fans and reversible current devices. Although these much desired improvements have been made in the mechanical devices for handling water and for ventilating the workings, the method par excellence for both drainage and ventilation is by means of tunnels.

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MINING SCHOOLS. The need of technical schools specially equipped for preparing young men for the profession of mining engineering was long ago recognized, and some of the institutions have exerted through their graduates a marked and beneficial influence upon the mining industry of the world. The best known of the European mining academies are those at Freiberg (Saxony), Clausthal, Aix-la-Chapelle and Berlin (Prussia), Leoben and Przibram (Austria), Paris and St. Etienne (France), and London (England). In addition to these, separate schools for mine foremen are maintained at Freiberg, Clausthal, Aix-la-Chapelle, St. Etienne, Przibram and elsewhere. The leading schools of the United States are: the School of Mines of Colum-

bia University, the Mining Department of the Massachusetts Institute of Technology, the College of Mining of the University of California, the State School of Mines of Colorado, the Michigan College of Mines, the School of Mines of the University of Minnesota and the schools at Lehigh University and Lafayette College. The courses of study occupy four years, but exhibit quite wide variations in plan and scope, though generally consisting of the following:

First Year.—Algebra—general theory of equations, analytical geometry, spherical trigonometry, general inorganic chemistry, qualitative analysis, physics, descriptive and determinative mineralogy, including crystallography and blow-piping, theory of surveying and mechanical draughting. In the following vacation, five weeks' field practice in surveying.

Second Year.—Calculus, elementary and analytical mechanics, physics, industrial chemistry, theory of railroad surveying, general geology, elements of electrical engineering, quantitative analysis, descriptive geometry and drawing. In vacation, five weeks' field work in general surveying and four weeks' railroad surveying.

Third Year.—Analytical mechanics, economic geology, properties and resistance of structural materials, masonry and timber construction, engineering of power plants, earth and rock excavation, railroad and mine tunnels, boring and shaft-sinking, exploration, development and methods of working mines, general metallurgy, and metallurgy of the non-ferrous metals, graphic statics, assaying, principles of electrical engineering, experimental mechanical engineering, optical mineralogy and petrography. Vacation work: five weeks' systematic study in mines, one week's study in metallurgical works and one week of field geology.

Fourth Year.—Thermodynamics, steam engines and boilers, heat and its applications, motors other than steam, hydraulics, ore-dressing, mine engineering, mine plant and equipment, mine surveying, mine administration, metallurgy of silver, gold, iron and steel, draughting and design of mine plant, geological examinations and surveys, thesis or project in mining. Laboratory work is required in connection with geology, mineralogy, physics, qualitative and quantitative analysis, assaying, testing of materials, electrical engineering, metallurgy and ore-dressing.

MINION, n. *mĭn'yŭn* [F. *mignon*; It. *mignone*, a darling, a favorite; Dut. *minnen*, to love: comp. Gael. *min*, soft, gentle]: a favorite, particularly of a prince; a low or unprincipled dependent or flatterer; among *printers*, a letter of a particular size. MINION-LIKE, daintily.

MINISH, v. *mĭn'ĭsh* [F. *menuiser*, to minish, to extenuate—from mid. L. *minutārĕ*, to reduce to fragments—from *minūtus*, small]: another and now obsolete spelling of DIMINISH, which see.

MIN'ISTER, n. *mĭn'ĭs-tẽr* [F. *ministre*—from L. *minister*, an attendant, a servant—from *minus*, less: opposed to *magis'ter*, the person in superior place—from *magis*, more]: pastor of a church; a clergyman (see CLERGY): in the governmental administration of a country, the head of a department of government appointed by the chief executive or by the sovereign (see MINISTRY, in Executive Government); in diplomatic affairs, the representative of a national government or of a sovereign at a foreign state, but (in the strict use of the term though not always in popular use) without the dignity of an Ambassador (q.v.—see also MINISTER, in Diplomacy); V. to give aid or relief, as to the sick or poor; to perform, as the duties of an office. MIN'ISTERING, imp. *-ĭs-trĭng:* ADJ. attending and serving; affording aid or things needful. MIN'ISTERED, pp. *-tẽrd.* MINISTRATION, n. *mĭn'ĭs-trā'shŭn*, the office of a minister, or the service performed by him; agency. MIN'ISTRA'TIVE, a. *-tĭv*, affording service; assisting. MIN'ISTE'RIAL, a. *-tē'rĭ-ăl*, pertaining to ministers of religion, or to the chief servants of a state or sovereign; official; executive; attendant. MIN'ISTE'RIALIST, n. *-ăl-ĭst*, in *politics*, a supporter of the ministry holding office. MIN'ISTE'RIALLY, ad. *-lĭ*, in a ministerial manner; after the manner of the executive; officially. MIN'ISTRANT, a. *-trănt*, performing service as a minister; attendant on service. MINISTRY, n. *mĭn'ĭs-trĭ* [L. *ministĕrĭŭm*, service, attendance]: agency or service of a minister of religion; the office, duties, or functions of the chief ministers of a state or sovereign; the period of duration of such official function; the body of ministers of a state; the clergy collectively (see CLERGY): agency; interposition; employment. PRIME MINISTER, in Great Britain, the first lord of the treasury, and head of the British government, who appoints his colleagues. CABINET MINISTERS, or executive government, in Great Britain (see MINISTRY, in Executive Government).—SYN. of 'minister, n.': priest; parson; official; ambassador; delegate;—of 'minister, v.': to serve; attend; wait upon; officiate; administer; contribute;—of 'ministerial': ecclesiastical; clerical; sacerdotal; priestly.

MIN'ISTER, in Diplomacy: delegate or representative of a national government or of a sovereign at a foreign court to treat of affairs of state. Every independent state has a right to send public ministers to, and receive them from, any other sovereign state with which it desires to be in amity. Semi-sovereign states have generally been considered not to possess the *jus legationis*, unless when delegated to them by the state on which they are dependent. The right of confederated states to send public ministers to each other, or to foreign states, depends on the nature and constitution of the union by which they are bound together. The constitution of the United Provinces of the Low Countries and of the old German Empire preserved this right to the individual states or princes, as do the present constitutions of the

German Empire and Swiss Confederation. The constitution of the United States either greatly modifies or entirely takes away the *jus legationis* of each individual state. Every sovereign state has a right to receive public ministers from other powers, unless where obligations to the contrary have been entered into by treaty. Diplomatic usage recognizes three orders of ministers. Ministers of the first order possess the representative character in the highest degree, representing the state or sovereign sending them not only in the particular affairs with which they are charged, but in other matters: they may claim the same honors as would belong to their constituent, if present. This first class of diplomatic agents includes papal legates and nuncios, and ambassadors ordinary and extraordinary. A principle of reciprocity is recognized in the class of diplomatic agents sent. States possessing the honors of royalty send to each other ministers of the first class; so in some cases do those states also which have not such honors; but it is said by some writers on international relations that no state having such honors can receive ministers of the first class from states not possessed of them. For the states that are held to possess royal honors, see DIPLOMACY.

Ministers of the second and third order have not the same strictly representative character; their representation is held not to go beyond the affairs with which they are charged. They are, however, the natural protectors of the subjects of the state or country sending them in the country to which they are sent. Ministers of the second class include envoys, whether these are simply so styled, or denominated envoys extraordinary, also ministers plenipotentiary. The third class of ministers does not differ from the second in the degree of their representative character, but only in the diversity of their dignity, and the ceremonial with which they are received. This class comprehends ministers, ministers resident, ministers chargés d'affaires, such consuls as are possessed of a diplomatic character, and those chargés d'affaires who are sent to courts to which it is not wished to send agents with the title of minister. Ministers of the third class have, for the most part, no letters-credential from the chief executive or the sovereign, and are accredited only by letters to the foreign minister or secretary of the country to which they are sent.

Besides these orders of ministers, other diplomatic agents are occasionally employed—e.g., deputies sent to a congress or confederacy of states, and commissioners to settle territorial limits or disputes concerning national jurisdiction. These are generally considered to possess the privileges of ministers of the second and third order. Ministers-mediators are ministers sent by two powers, between which a dispute has arisen, to a foreign court, or congress, where a third power, or several powers, have, with the consent of the two powers at variance, offered to mediate between them.

Diplomatic ministers, except, as above mentioned, those of the third class, are accredited by a letter to the chief executive or the sovereign of the country to which they are sent. The letter of credence is usually dispatched under a *cachet volant*—i.e., a seal which does not close the letter; or else, in addition to the principal letter, an authenticated copy is sent, which the diplomatic minister on his arrival presents to the minister or secretary of foreign affairs, as the warrant for his right to demand audience of the personal head of the govt. or the sovereign; the original is presented to the personal head of the govt. or the sovereign. Ministers sent to an international congress or diet have usually no credentials, but merely a full power, of which an authenticated copy is delivered into the hands of a directing minister, or minister-mediator. A minister of the first class is received to both public and private audiences by the chief executive or the sovereign to whom he is accredited; a minister of the second class generally to private audiences only. Diplomatic ministers are entitled to conduct negotiations either directly with the sovereign or chief executive, or with the minister or secretary for foreign affairs. The latter course is more usual, and generally more convenient.

The U. S. govt. until 1893 allowed its accredited representatives at foreign courts no higher rank than that of minister, but in that year Congress empowered the Pres. to raise to the rank of ambassador extraordinary and plenipotentiary the American minister accredited to any state which should previously confer a similar promotion upon its minister at Washington. Great Britain, France, Italy, and Germany quickly promoted their representatives at Washington, and the U. S. raised the rank of her representatives at the courts of St. James, Paris, Rome, and Berlin. For the rules and usages of the U. S. diplomatic service, etc., see AMBASSADOR: DIPLOMACY. The title 'Excellency' has, since the peace of Westphalia, been accorded to all diplomatic ministers of the first class; and in some courts it is extended to ministers of the second class, or at least those sent by the great powers. For the immunities and privileges of diplomatic agents, see AMBASSADOR: DIPLOMACY: ENVOY: CONSUL.

MIN'ISTRY, in Executive Government: the body of ministers of state, or of heads of departments in the government, to whom the chief magistrate or sovereign of a country commits the superintendence of executive administration.—In Great Britain, the CABINET is composed of a limited number of privy councilors holding the more important offices in the M.; and the individuals who thus form the cabinet are selected by the prime minister, who presides at its meetings.

It is a principle of the constitution of Great Britain, that the sovereign is irresponsible, the real responsibility resting with the administrative government. The 'King's Council, or PRIVY COUNCIL, were the earliest advisers of the sovereign in matters of state but when

this body, in course of time, was found too large for dispatch of business, its duties were transferred to a small committee of privy councilors selected by the king. As late as in Charles I.'s time, all the more important resolutions of the crown were taken after deliberation and assent of the Privy Council. An unsuccessful attempt was made in the reign of Charles II. to restore the council to its original functions. Its numbers were limited to 30; and it was intended that this limited council should have control of the whole executive administration, superseding any interior cabinet. But the council was found too extensive for an effectively working ministry, and the former arrangement was restored. The cabinet may be regarded as but a committee of the Privy Council (q.v.); and its exclusive right to discuss and determine the plans and business of the govt. has been often said not to be recognized by the law; a position which, however, was disputed by Lord Campbell, who maintained that, 'by our constitution, it is in practice a defined and acknowledged body for carrying on the executive government of the country.' The cabinet is a merely deliberative body; its members collectively have no power to issue warrants or proclamations; but all important measures which engage the attention of the govt., whether regarding matters domestic, foreign, or colonial, and all plans of action, whether purely administrative, or to be carried outin parliament, must be proposed, considered, and adopted by the cabinet. The sovereign intrusts the formation of a ministry to a statesman, who selects for its members those who agree in his political views. He generally places himself at the head of the govt. as First Lord of the Treasury, and in popular language he is called the Premier, or Prime Minister. The Lord Chancellor, the Chancellor of the Exchequer, the Secretaries of State for Home, Foreign, Colonial, and Indian Affairs, the Secretary of War, and the Pres. of the Council, are necessarily members of the cabinet; also generally the heads of various other important departments of govt., including usually the First Lord of the Admiralty, Pres. of the Board of Trade, Postmaster-gen., Pres. of the Poor-law Board, Chancellor of the Duchy of Lancaster, and occasionally Chief Sec. for Ireland. The Premier has sometimes held the office of Chancellor of the Exchequer in conjunction with that of First Lord of the Treasury. A privy councilor of great political weight is sometimes called into the cabinet without office, and takes the post of Lord Privy Seal. Her Majesty's ministers who have usually no seat in the cabinet include the following: Chief Sec. for Ireland, First Commissioner of Works, Vice-pres. of the Board of Trade, Vice-pres. of the Committee on Education, Commander-in-chief, Lord Chamberlain, Steward, Master of the Horse, Master of the Buckhounds, Comptroller of the Household, Lord Lieut. of Ireland, Attorney-gen. and Solicitor-gen. of England, Lord Advocate and Solicitor-gen. of Scotland, and Attorney-gen.

and Solicitor-gen. of Ireland. Occasionally, but exceptionally, the Commander-in-chief, and the Lord Chief Justice of England, have been members of the cabinet. A M. is often spoken of as the M. of the person who is at its head, and sometimes as his government.

Meetings of the cabinet are held on the summons of any one of its members, usually at the Foreign Office. Its proceedings are secret and confidential, and no record is kept of its resolutions, which are carried into effect by those of its members to whose departments they severally belong. As the acts of a M. are at all times liable to be called in question in parliament, it is necessary that the heads of the chief departments should have seats in either house, in order to be able, when required, to give prompt explanations.

A govt. exists only so long as it can command the confidence of parliament. The sovereign has the power to dismiss his ministers whenever they cease to possess his confidence, but such a change would be useless without the support of the house of commons, who, by withholding their support, could paralyze all the functions of government. A sovereign has sometimes rid himself of a M. with whose policy he was dissatisfied, by dissolving parliament, and appealing to the country. Where a M. cannot command the confidence of parliament, i.e., when their important measures are rejected or discarded by its significant vote, they resign, and a statesman of some other political party is sent for by the sovereign, and authorized to form a new cabinet. All the adherents of a M. filling political offices resign with it, also the great officers of the court, and those officers of the royal household who have seats in either house of parliament. Sometimes officers holding lucrative appointments which do not necessitate resignation, have retired, as a manifestation of adherence to their political friends. In addition to the ministers already named, the following adherents of the M. go out of office on a change of govt.: the three junior Lords of the Treasury, the two Secretaries of the Treasury, the four parliamentary Under-secretaries of State, Paymaster-gen., Master-gen. of the Ordnance, Surveyor-gen. of the Ordnance, the five junior Lords of the Admiralty, first Sec. of the Admiralty, Chief Commissioner of Greenwich Hospital, Pres. and Parliamentary Sec. of the Poor-law Board, Pres. of the Board of Health, Vice-chamberlain, Capt. of the Gentlemen-at-arms, Captain of the Yoemen of the Guard, the Lords in Waiting, Mistress of the Robes, Treasurer of the Household, Chief Equerry, or Clerk Marshal, Judge Advocate-gen., and the Lord Chancellor for Ireland. The private sec. to a minister loses office on a change, his appointment being purely personal; and some changes are usually, though not always, made in ambassadors extraordinary.

In the United States there is no M. in the British use of that term: the chief ministers are the superintendents of the great executive departments of government,

they are known as secretaries, and as a body they form an advisory conference known as the president's cabinet. They are chosen and appointed by the president, and take office on confirmation by the senate; they hold office entirely at the will of the president, and they administer their functions as under his direction and with immediate responsibility to him. They are held to administer in their respective departments the executive control which the laws vest in the president; thus their functions are of high importance and honor, and their influence is great, so long as they hold his confidence. They meet statedly, or as summoned by the president, in advisory conference; but they are not an executive council issuing orders, nor is the president under any legal obligation either to ask or to follow their advice: this illustrates the fundamental difference between the cabinet of secretaries of the president of the United States, and the cabinet of ministers of the British crown. The members of the cabinet number nine and in order of their succession to the office of president—should it become vacant and there be no vice-president to fill it—they are as follows: Secretary of state, secretary of the treasury, secretary of war, attorney-general, postmaster-general, secretary of the navy, secretary of the interior, secretary of agriculture, and secretary of commerce and labor. In 1908 it was proposed also to add to the above a secretary of education. See SECRETARIES OF EXECUTIVE DEPARTMENTS.

MINIUM, n. *mĭn'ĭ-ŭm* [L. *mĭnĭŭm*, red lead or vermilion]: red oxide of lead; red-lead ore: see LEAD.

MINIVER: see MINEVER.

MINK (*Mustela lutreola*): quadruped, a species of weasel, inhabiting northern Europe and Asia; very similar to which in characters and habits is another species by some regarded as only a variety of the same, the mink or VISON (*M. vison*) of North America, abundant in almost every part of that continent. Both inhabit the neighborhood of streams, lakes, and marshes; have semipalmated feet, are expert swimmers and divers, and prey on fishes, frogs, and other aquatic animals, also on birds, rats, mice, etc. They are covered with downy fur, interspersed with longer and stronger hairs: the color is brown, with more or less white on under parts. The American mink is generally larger than that of the old world, being often more than 18 in. from the nose to the root of the tail, while the latter is seldom more than 12 in. It has also a more bushy tail. It is very active and bold, and often commits great depredations in poultry yards, carrying off a fowl with great ease. Unlike most of its congeners, it is easily tamed, and becomes much attached to those who caress it. In domestication, it ceases to regard the inmates of the poultry yard as prey. It emits an unpleasant odor only when irritated or alarmed. The fur of the mink is valuable.

MINNEAPOLIS, *mĭn-ĭ-ăp'ō-lĭs:* city, cap. of Hennepin co. Minn., on both sides of the Mississippi river, at the falls of St. Anthony; lat. 44° 58′ n., lon. 93° 15′ w.; 8 m. w.n.w. from St. Paul (10 m. by rail and 14 m. by the course of the river); about 838 ft. average elevation above sea-level. About three-fourths of M. lies w. and s. of the river, which enters it on the n. a little w. of the middle of the n. boundary, flows on a curve, which passes to the left of the city centre, and goes s.w. out of the city, thus inclosing in a bow the n. e. quarter of the site. A large island in the river, named after the explorer Nicollet (q.v.), a little n. of the centre of the city, is built on, and both city and railway bridges conduct across it near the heart of the city. A second island lower down, of less size, has another historic name, Hennepin. Above and below the islands several other long bridges span the Mississippi for railway travel or for ordinary passage. The general nature of the site of M. is that of a broad esplanade, nearly level for from one to two m. back from the river, with chains of wooded bluffs beyond, on which there are many fine residences. The situation is healthful, as there are no marshy grounds near, and the natural drainage is excellent. The soil is a sandy loam, above a layer of gravel, which rests on limestone, and that on a soft sandstone. The falls of St. Anthony are overlooked by the city, and 3 m. below it a beautiful resort is afforded by the Minnehaha Falls (q.v.). In the vicinity of M. are numerous lakes, especially on the w. and s.w., which greatly add to the attractions of a remarkably beautiful region. They have already become summer resorts comparable to some of those noted at the East.

The falls which have contributed so much to the prosperity of M., were discovered, and named for St. Anthony, 1680, by Father Louis Hennepin, a priest who accompanied the Fr. explorer Accault in his upper Mississippi journeyings. They remained little known for nearly 140 years, until, 1819, the establishment of Fort Snelling, at the mouth of the Minnesota river, abt. half way between the falls and the site of St. Paul, brought them again under observation. The milit. reservation of Fort Snelling extended over most of the present site of M., and thus included the vicinity of the falls. These occur in the course of a descent of the river amounting to 80 ft. within a m., and 65 ft. within three-quarters of a mile. They are formed by a perpendicular face of sandstone, 18 ft. high, and divided into two by Hennepin Island. The attractions of the spot are those not only of the fall of water, but also of the surrounding view. The division of the river into an e. and a w. channel, gives on the w. side, which has the largest channel, one of the most remarkable water-powers known. Even at a low stage the river precipitates down its bed of solid limestone, 450,000 cubic ft. of water per minute. The force is computed to be equal to 100,000 actual horse-power (or 120,000 theoretical). The shores are of such

a character, passing round the long side of the bend of the river, as to allow canals to be excavated by the side of the stream to any extent, with the best of rock for their walls and bed, yet rock not difficult of excavation. The hard limestone, moreover, of the bed of the river, affords a secure foundation for dams and for mills. The canal by which the power is taken, branches off from the w. channel a short distance above the falls. It is 60 ft. wide and 14 ft. deep, and passes by a course parallel to the river down to the mills. Nothing in the entire system is ever liable to injury by floods, the rise of the river always taking place so gradually as to preclude destructive freshets. There has been some solicitude concerning the ultimate wearing away of the falls. The drawing of all the water through the canals, often leaves the ledge exposed to the rapidly disintegrating action of frost, and when a great volume of water is pouring over the ledge another injurious action results. The easily worn sandstone at the bottom of the falls, is cut away by the water, and the ledge becomes undermined, and liable to give way: 90 ft. did give way at once 1851. The river banks show that the falls have already receded from the mouth of the Minnesota river 9 m.; and there remains only 1,200 ft. in length of the rock bed which makes the falls. The earliest attempt to provide against the peril of destruction of the falls only made the matter worse, but the building of a concrete wall behind the falls and underneath the channel of the river—a wall 4 ft. thick and 38 ft. in height, entirely across the stream, and 50 ft. into the bank on each side—has effectually removed the danger of undermining the ledge. At the same time an apron, or inclined plane, of timber, with heavy crib-work filled with stones, serves to protect the falls from wearing away. This work cost $884,500, of which the United States furnished $550,000, and M. the rest. In 1879 a sluiceway was built on at the w. end of the apron, 6 ft. wide and 346 ft. long, for the passage of logs without damage to the apron. This was done by the U. S. govt., in whose hands the falls now are for preservation.

The river is navigable eight months in the year below the falls, and with proper improvements would have five ft. of water at all times. Above the falls light draft boats may ascend 80 m. at any time, there being two ft. of water at the lowest stage. There are 16 railroads connecting with M., with 15,000 m. of track. The chief lines are the Chicago Burlington and Northern, Chicago St. Paul Minn. and Milwaukee, Wisconsin Central, Minn. St. Paul and Sault Ste. Marie, St. Paul and Duluth, Northern Pacific, Great Northern, St. Paul Minn. and Manitoba, St. Paul Minn. and Omaha, and Minn. and St. Louis.

The climate of M. is healthful and bracing, being especially sought because of the dry and tonic character given by the prevailing winds and by the absence of marshes, or of waters or lands liable to affect it unfavorably. The

COURTHOUSE AND CITY HALL.

highest recorded summer temperature is 101°; the highest in average years 94°; the mean 67°. The lowest winter temperature —40°; the lowest in average years —30°; the mean, 12·5.

M. is regularly laid out over 52½ sq. m. of territory; the streets and avenues are straight, usually 80 ft. wide, and in the residence quarters are made attractive by fine grounds, commonly without fences. Shade trees are generally set out; and in all streets outside the business portion about one-fourth the width is occupied by grass and two rows of trees on each side, with foot-walks six to eight ft. wide between the rows. An extended service of horse-cars exists through the chief avenues. The street railway combination covering Minneapolis (52½ sq. m.) and St. Paul (55·44 sq. m.)—the city limits meeting so that the e. side of Minneapolis bounds the w. side of St. Paul—contracted, 1890, Feb., for an electric railway equipment of the entire system, at a cost of nearly $2,000,000, to be in operation June 1. The Sprague Electric Railway and Motor Co. supply under this contract 360 motors. Electric lighting has been introduced.

No artificial parks have been made, the groves, lakes, etc., of the suburbs more than supplying their place. There are four lakes within 3½ m. of the city, also the falls of Minnehaha. There are five cemeteries connected with the city: Lakewood, 3½ m. s. from the city centre, 153 acres; Layman's, 2 m. s.e., 20 acres; Maple, 1½ m. n.e., 10 acres; a Rom. Cath., and a Hebrew cemetery. The water-works are owned by the city. The Holly system of direct pumping is used, with average pressure 53 lbs. The works cost, with mains and pipe 18 m. 3,461 ft. in length, and a daily capacity of 7,500,000 gals., $396,598.83. The gas-works are not owned by the city. The number of fine edifices is very large, including the Chamber of Commerce, the Exposition Building, the residence of W. D. Washburn, which cost $1,000,000, the Post-office, costing $750,000; the West Hotel, costing $1,500,000; the Lumberman's Exchange, the Tribune Building, the Syndicate Block, and the Masonic Temple. There are a city hall, city prison, several engine-houses, two opera-houses, an athenæum, several national and several private banks, ten fine public school buildings, an academy, two female seminaries, and a medical college.

The number of schools is about 30. Higher institutions of learning are the University of Minnesota; the Augsburg Theol. Seminary established 1869 by the Scandinavian Lutherans of the northwest; and Macalester Coll. The churches number over 100, representing 15 denominations, of which the more numerous are the Meth.; Lutheran; Baptist; Congl.; Presb.; Episc.; Rom. Cath.; and Univ. There are six daily and 39 weekly newspapers; also 10 semi-monthly and 13 monthly publications.

The govt. of M. is by a mayor and a board of aldermen, two from each of the ten wards into which the city is divided. The fire dept. is equipped with steam fire-en-

gines, hose carriages, hook and ladder trucks, and an adequate force of disciplined men. A fire-alarm telegraph is in use.

M. is the chief manufacturing and distributing point for the timber lands of the whole upper Mississippi valley. The country in the immediate vicinity is divided between production of grain and of stock. Of the wheat produced in Minn. and sent to market, more than half is manufactured into flour by the mills of M. There are over 20 elevators with capacity of more than 15,000,000 bushels. There are 26 flouring-mills, with capacity of 36,148 barrels daily. They make into flour 20,000,000 bushels of wheat in a year, by processes which have revolutionized the production. The three mills of Washburn, Crosby and Co. can make 6,500 barrels of flour daily, employing 281 hands. The Pillsbury 'A' mill is the largest in the world, and has a daily capacity, fully equipped, of 25,000 bushels of wheat. There were in 1900 2.368 manufacturing establishments, employing 26,688 persons and paying wages $12,708,523; using materials valued at $78,175,735; products, $110,943,043. The principal articles were, flouring and grist mill products, $49,673,568; carpentering, $5,412,038; foundry and machine shop products, $2,570,601, and masonry supplies, $2,267,773. 1902, Sept. 15, there were 4 national banks, cap. $3,250,000, 17 state banks, $2,820,000; 5 fire insurance cos.; assets (of 4 reporting) $1,085,209; liabilities $273,804.

History.—The first saw-mill was built 1822, and grist-mill added, for the use of Fort Snelling. The Indians ceded the lands e. of the river 1837, and 1838 the first settlement was made. Persons from Boston bought a large share of the water-power, 1847, and a dam was completed across the e. channel, from Hennepin Island to the main shore, 1848. Minn. Territory was organized in the winter of 1848–9, but the lands w. of the river were still Indian, and most of the site of M. was within the Fort Snelling govt. reservation. The first permits to occupy land were got 1849, and the first house in w. M. begun. In 1853 there were about a dozen houses. Pre-emption rights were granted 1855, and a town govt. was organized 1858. The city charter dates from 1867. Till this time, the settlement on the e. side of the river had been, from 1849, known as St. Anthony, and had become a city 1855. In 1873 the two were consolidated as Minneapolis. 1890, June, the total milling capacity of M. was over 25,000 barrels a day. Two years before an explosion and fire destroyed six of the largest flouring-mills, half the producing power of the milling district, but they were all rebuilt in the next two years, with increased capacity. Pop. (1870) 13,066; (1880) 46,887; (1885) 129,200; (1890) 164,738;)1900)202,718; (1910) 301,408.

MINNEHAHA River, *mĭn-ĭ-hâ'hâ* (and Falls): small stream in Hennepin co., Minn., to which the Dakota Indians gave the name *Minne-haha*, or water-laughing. Half a mile above its mouth, where the channel passes over a limestone precipice 60 ft. high, the waters make falls of remarkable beauty. The mouth of the M. river, where it enters the Mississippi river, is three m. below Minneapolis, and the falls are among that city's most interesting pleasure resorts. The city has provided at the M. falls a site of 51 acres for a soldiers' home, with the design of making it eventually a part of its park system. This home was opened 1887, November.

MINNESINGERS, *mĭn'nĕ-sĭng-ėrz:* designation of the earliest lyric poets of Germany, 12th and 13th c.; from *Minne*, love, which was at first their predominating, and almost sole subject. The works of the M. are mostly superior to those of their more generally known contemporaries the troubadours, in delicacy of sentiment, elegance and variety of rhythmical structure, and grace of diction. Henry of Veldig, early in the 12th c. at the court of the Swabian, Frederick Barbarossa, Emperor of Germany, is regarded as the father of the M., and Walther von der Weide (b. abt. 1170) as the last of this great vocal band, which included emperors, princes, nobles, and knights. Many of their productions have perished, though, in addition to a very large collection of poems by anonymous M., there are some remains of the songs of more than 150 known composers. Among the most celebrated of these are: Wolfram von Eschenbach (q.v.), Henry von Ofterdingen, Hagenaue, Hartmann von der Aue (q.v.), Gottfried von Strasburg (q.v.), Otto von Botenlauben, Truchsess von St. Gall, and Ulrich von Lichtenstein—men of noble houses, who, though they belonged to various parts of Germany, wrote almost exclusively in the Swabian dialect, which, during the brilliant days of the Fredericks and Conrads of the House of Swabia, was the language of the court in Germany. Among the few other forms of German employed by the M., the one next in favor was the Thuringian, adopted in compliment to Hermann, Landgraf of Thuringia, who, next to the princes of the Swabian dynasty, was the most munificent patron of the M. during the period of their renown, in the early part of the 13th c. Besides songs in praise of women, the M. composed odes on public or private occasions of lament or joy, distiches or axioms, and *Wachtlieder*, or watch-songs, in which the lover was represented as expostulating with the watchman, who kept guard at the gate of the castle within which his lady-love was imprisoned, and trying to persuade him to grant him admittance to her presence. These songs and odes were recited by the composer, to his own accompaniment on the viol; and as few of the M. could write, their compositions were preserved mostly by verbal tradition only, and carried by wandering minstrels from castle to castle throughout Germany, and even beyond its borders. As the variety of rhythm and

complicated forms of versification affected by the M., especially toward the decline of their art, rendered it difficult to retain by memory the mass of Minnesong which had been gradually accumulated, these itinerant musicians finally made use of written collections, a practice to which alone we are indebted for the many beautiful specimens of early German lyrical poetry which remain. The glory of the M. may be said to have perished with the downfall of the Swabian dynasty under which greater liberty of thought and word was allowed among Germans than they again enjoyed for many ages; and in proportion as the church succeeded in re-asserting its sway over the minds of men, which it had lost under the rule of the chivalric Fredericks, freedom of speech and action was trammelled, and song and poetry contemned. Paraphrases of Scripture, hymns, and monkish legends, took the place of the chivalric songs of the nobly born M., and German poetry was for a time almost annihilated.

In the 14th c., the art of Minnesong was partially revived, though under a rude and clumsily elaborated form, by the *Master-singers* (Meistersingers), a body of men belonging to the burgher and peasant classes, who, in accordance with their artisan habits, formed themselves into guilds or companies, binding themselves to observe certain arbitrary laws of rhythm. Nuremberg was the focus of their guilds, which rapidly spread over the whole of Germany, and gained so firm a footing, that the last of them was not dissolved at Ulm till 1839. As the title of master was awarded only to a member who invented a new form of verse, and the companies consisted almost exclusively of uneducated persons of the working-classes, it may easily be conceived that extravagances and absurdities of every kind speedily formed a leading characteristic of their modes of versification; attention to quantity was, moreover, not deemed necessary, regard being had merely to the number of the syllables, and the relative position and order of the verses and rhymes. Their songs were lyrical, and sung to music; and though, each master was bound to devise a special *stole* or order of rhymes for each of his compositions, these stoles were subjected to a severe code of criticism, enacted by the *Tabulatur*, or rules of the song-schools. Among the few masters who exhibited any genuine poetic feeling, the most noted were Heinrich Mügeln, Michael Behaim, and the Nuremburg shoemaker, Hans Sachs, who prided himself on having composed 4,275 *Bar* or Master Songs. See Tieck's *Minnelieder* (1803); Taylor's *Lays of the Minne and Master Singers* (Lond. 1825); and Von der Hagen's *Minnesänger* (4 vols. 1838).

MINNESOTA, *mĭn-ē-sō'ta:* state, one of the United States of America; 19th in order of admission into the Union; 26th in population 1880, 20th in 1890, and 19th in 1900; in 1902 2d in flaxseed, 1st in spring wheat, 4th in oats, 3d in barley, 5th in cattle, 8th in horses, 26th in sheep, 11th in swine, and 7th in oats and acreage of grass mown; 10th in railroad mileage. The name, from the Minnesota river, means 'water-sky-tinted.'

Location and Area.—M. is at the head of the upper Mississippi valley, lat. 43° 30′—49° 24′ n., long. 89° 39′—97° 5′ w.; bounded n. by the Dominion of Canada, the line running on the 49th parallel from the Red river of the north to the Lake of the Woods, thence n. to inclose a fragment of territory w. of the lake, and s. of its n.w. angle, thence descending s. and s.e. through the lake, down Rainy Lake river, through Rainy and other lakes, and down Pigeon river to Lake Superior; e. by Lake Superior and Wis., the line from the lake following the St. Louis river to its first rapids, then falling due s. to the St. Croix river, thence by the St. Croix to the Mississippi river, and down this river 134 m. to the s.e. corner at lat. 43° 30′; s. by Iowa; w. by Dak., the line being a due n. line from the Io. boundary to the s.e. outlet of Big Stone Lake, the head of M. river, thence through the lake, along the line of Lake Traverse, of the Bois des Sioux river to its junction with the Red river of the north, and thence by this river to the n.w. corner. The extreme length n. and s. is 380 m.; greatest breadth in the n. 337 m.; on the s. boundary 262 m.; opposite the mouth of the St. Croix 183 m.; area, 83,531 sq. m. (53,459,840 acres); greatest elevation above sea-level 1,680 ft.; extent of navigable waters, shore line of 2,746 m.; water line of 1,532 m.; river navigation about 1,200 m.

Topography.—The surface is in general an undulating plain, averaging about 1,000 ft. elevation above sea-level, with broken highlands in the extreme n.e. drained by tumbling streams which go n. into Rainy Lake chain or s. into Lake Superior; alluvial levels in the n.w. belonging to the Red river valley; a group of low flat-topped elevations extending across the middle of the n. part of the state and serving as the gathering-place of the head waters of the Mississippi river; and thence s., over the whole breadth of the state, a gradual slope, determining the descent of the Mississippi river, covered to about the centre of the state with the great belt of pine woods which reaches across from Lake Superior to the Red river valley; below the centre of the state, a region of rolling prairie, dotted with lakes and groves; and along the Minnesota river, from n.w. to s.e., across the s.w. corner of the state, a tract, more than 40 m. wide and 100 m. long (5,000 sq. m. in all), which forms a belt of hardwood trees, known as the Big Woods. Not only is the region of low hills and lakes, at the centre of the n. part of the state, the source of the Mississippi river

(q.v.), 797 m. of which belong to M., but the three great continental river systems, of the Mississippi, the Red river of the north, and the great lakes, and the St. Lawrence, about equally claim this continental crown of land as their place of beginning. Of the last the St. Louis river is the head, beyond the remote w. end of Lake Superior. The St. Croix river on the e., where it is a boundary for 129 m., of which 53 are navigable, and the Minnesota river, in a long loop across the s. part of the state, help to gather the vast mass of Minn. waters into the Miss., and make it from the confluence of the St. Croix a stream of the first magnitude. The Red river of the north gathers its waters in part along the upper half of the w. side of the state; and the Des Moines, for about 135 m. has its head stream in the s.w. corner of M., becoming navigable 20 m. before it passes into Iowa, on its way to give the Mississippi the waters of more than 10,000 sq. m. of that state.

The number of the lakes of M. is not less than 7,000, of all sizes, from a mile to 30 m. in diam., many of them having an area of more than 100 sq. m., and the whole aggregating a water surface, in the state, of 4,160 sq. m. Seldom marshy, their waters clear and cool, abounding in various kinds of fish, and their shores skirted with forest growth of every kind, they contribute at once to the beauty of the landscape and to the temperate and pure quality of the air of a region which is exceeded in salubrity by no part of the continent. They are largely of glacial origin, and form part of the s. fringe of the lake region of N. America.

Climate.—The central continental elevation of M. has climatic effects rarely combined. There are no superfluous spring and autumn rains, no prevalence at times of fogs and damp weather, and no injurious extremes of heat and cold. Days of hottest weather in summer are joined with nights delightfully cool, making the conditions of both vegetable and animal life ideally favorable; and the lowest cold of winter is so modified by the dryness of the air as to have no extreme severity, even for sensitive invalids, but rather an invigorating energy extremely favorable to health and activity. The average temperature, for 35 years, at St. Paul, was: for spring 45°·6; summer, 70°·6; autumn 40°·9; winter 16°·1; average of the year 44°·6. The average of the hottest week in summer is 85° to 90°; that of the coldest week of winter —10° to —20° (below zero). The average rainfall is about 25·5 in. annually, less than two in. being in winter, and about 12 in. being in summer. 70 per cent. of the yearly heat falls in the season of vegetable life; and 76 per cent. of both the rainfall and the atmospheric humidity. The prevailing winds are from the s. or s.e.

A remarkable fact of the topographical climatic position of M. is, that it appears to be but the gateway to a continental plain, extending n.w. far up to the 60th parallel, in the valley of the Peace river, its breadth reaching from 60 m. w. of Winnipeg 900 m. across to the des-


Longitude West from Greenwich.
MINNESOTA.
SCALE OF STATUTE MILES.
0 10 20 30 40 50 60 70 80
Copyright, 1904, by Rand, McNally & Co.
ONTARIO
N. E. CORNER OF MINNESOTA ON SAME SCALE.
LAKE SUPERIOR
Grand Marais
Lutsen
Redmyer
MANITOBA
LAKE OF THE WOODS
RED LAKE
MILLE LACS
DULUTH
MINNEAPOLIS
ST. PAUL
Brainerd
Faribault
St. Cloud
Winona
Mankato
Red Wing
WISCONSIN
IOWA
96°
94°
92°
RAND, MC NALLY & CO., ENGR'S, CHICAGO.

ert lands next e. of the Rocky Mts., and its area of temperature and soil highly favorable to human habitation and culture; crossing the systems of the Red, Assiniboine, Saskatchewan, Athabasca, and Peace rivers, over a region prepared by the character of its lands, and the continental flow n.w. of temperate air, to make many such great breadths of culture and population as the states of Minn., Io., and Illinois.

Geology.—The rock foundations of M. are chiefly azoic or the lowest protozoic. A central zone reaches from n. of Lake Superior diagonally across and down to the s.w. corner of the state, its granitic and metamorphic rocks forming rough hills in the extreme n.e., of considerable mineral wealth, but through the rest of their field having an ample covering of clays, sand, gravel, and bowlders, of glacial origin; overlaid by a sandy loam, which is very finely ground, rich in organic matter, deep brown or black in color, and of the greatest fertility. The e. slope, from the central watershed built up by the line of azoic rocks, bears a heavy growth of pine, spruce, and other coniferous trees, the Lake Superior end of the pine timber belt covering nearly a third of the state, but it has a comparatively sterile soil. The n.w. part of the state, on the other side of the watershed, is supposed to have a cretaceous foundation, and on it lies a great depth of drift and alluvium of the highest value for grain and grass, and for forests of oak, beech, elm, and maple. S. and e. of the central zone of azoic foundations, there lies under the rolling prairies, the groves, belts of forest, and numerous lakes, a stretch of sandstone, in part Red Potsdam. The lower Magnesian limestone underlies the extreme s.e. part of the state; the Trenton limestone occupies a large field in the s. and s.e., a valuable breath of it underlying the cities and vicinity of St. Paul and Minneapolis; and other limestones and sandstones crop out in the bluffs of the Mississippi and the banks of the Minnesota rivers.

Zoology.—The prairies and forests of M. were abundant in elk, deer, antelopes, bears, gray and prairie wolves, wild cats, foxes, raccoons, rabbits, squirrels, gophers, and woodchucks. Of aquatic animals the beaver, otter, mink, and musk-rats abounded. Grouse, wild turkeys, partridges, pigeons, quail, plover, larks, bald and golden eagles, hawks, buzzards, owls, etc., were very numerous; also wild geese, wild ducks, brant, pelicans, teal, loons, etc.; and a great variety of song and plumage birds. A partial list of birds counts 281 species; and of winter birds 52 species have been counted, 23 of which are permanent residents. In the numerous waters belong pickerel, pike, bass, sun-fish, white-fish, trout, etc.; and through a fish commission many waters have been stocked with black bass, lake and brook trout, lake white-fish, etc. In recent years the commission distributed in the waters of the state 22,813,147 fish, and 14,100,000 eggs, including the most

desirable species of food-fishes adapted to the lakes and streams.

Farming and Agricultural Products.—Minnesota is the tenth state in the Union in area. There are in the state 155,000 farms aggregating 27,000,000 acres, of which about 20,000,000 is improved lands. Thousands of acres of swamp land, worth $2 an acre, have been reclaimed by the ditch-work system perfected by the State Drainage Commission and are worth today $10 an acre. This work is in its infancy as yet, and consequently thousands of acres remain to be reclaimed to agricultural purposes. The total value of all the farm property in the state is $800,000,000, of which live stock and farm equipment represent about $125,000,000. Wheat is the most important single crop in Minnesota. Over half of the state's acreage is in wheat. The wheat crop of 1906 was 55,801,591 bushels, valued at $36,271,034. Minnesota raises one-fifth of all the barley raised in the country and ranks second among barley producing states, with an average crop of 30,000,000 bushels annually. Minnesota produces 75,000,000 to 90,000,000 bushels of oats and 15,000,000 bushels of potatoes annually, ranking fourth in oat production and ninth in potato production. In 1906 the principal crops were as follows: Corn, 50,149,277 bushels, valued at $17,050,754; wheat, 55,801,591 bushels, valued at $36,271,034; oats, 72,011,160 bushels, valued at $19,443,013; barley, 31,591,420 bushels, valued at $11,056,997; rye, 1,707,046 bushels, valued at $853,523; potatoes, 12,123,944 bushels, valued at $4,485,850; and hay, 1,459,390 tons, valued at $8,026,645. As an adjunct of the purely agricultural products of the state the creamery interest is one of the great industries of the state. There are in the state 700 creameries which are supplied by 54,000 farmers, who milk 420,000 cows. These creameries buy 1,500,000,000 pounds of milk every year, and make 76,000,000 pounds of butter yearly, which is sold for $18,000,000, of which amount $13,000,000 is paid to the patrons. The total dairy product of Minnesota is $35,000,000 yearly. In 1907 the farm annuals comprised 723,141 horses valued at $70,260,365; 8,657 mules valued at $816,090; 1,019,700 milch cows valued at $29,571,300; 1,305,000 other cattle valued at $17,460,900; 436,593 sheep valued at $1,744,626: and 1,377,000 swine valued at $12,393,000.

Manufacturing.—The manufactures of Minnesota are well known. Most important of these is flour and grist milling. In this industry there were in 1900 512 establishments with 4,086 employes, and with products valued at $83,877,709. In 1821 a saw-mill, the first manufactory in Minnesota, was built on the west side of the falls of St. Anthony. In 1823 it was fitted for the grinding of flour. A second mill was built in 1843, but for some time the development of the flour and grist milling industry was very slow. About 1870 the 'low grinding' process,

Education.—M. spends nearly $11,000,000 in maintaining its public schools, in which there are nearly 450,000 pupils enrolled, with about 14,500 teachers. There are normal schools, colleges and universities—both co-educational and for men only—many private secondary schools, besides schools of law, medicine, theology, and other technical schools.

Charities and Corrections.—The most important state charitable and corrective institutions include five large insane hospitals, a school for the blind, a school for the deaf, a school for the feeble-minded, a public school for dependent children, a training school, a State reformatory, and a state's prison.

Political.—St. Paul is the capital. Under a territorial agreement by which that city became the seat of government, Minneapolis secured the university and Stillwater the state prison. The state has completed a handsome capitol which, with its parks and approaches, cost approximately $5,000,000. The reapportionment of 1901 gave Minnesota nine congressional districts and eleven votes in the electoral college. For legislative purposes, the state is divided into 63 senatorial districts, electing an equal number of senators, for four year terms, and 119 members of the house of representatives, for two year terms. Minnesota is recognized as an impregnable republican state. But three times since its organization has it chosen a democratic governor, upon which occasion local issues controlled the result. The state gave 161,000 republican plurality in the presidential election of 1904.

History.—Jesuit accounts, as early as 1670-71, refer to the Indians of the region, Sioux or Dakotas, and Du Luth led the first trading expedition toward the Mississippi 1678, and later reached the great river by canoe passage from Lake Superior. Father Louis Hennepin, 1680, visited and named the falls of St. Anthony, and gave the first published report to the world. Perrot, a fur trader, came by the way of Fox and Wisconsin rivers to the Mississippi 1684, and founded the first trading-post, at Lake Pepin. Le Sueur ascended the Mississippi river to St. Anthony's falls 1700, and started a second trading-post. In 1763, English possession succeeded to French; and 1766 Carver entered on exploration of the upper Mississippi country. In 1783, Great Britain nominally yielded possession to the United States, and by the ordinance of 1787 all of Minnesota e. of the Mississippi was included in the n.w. territory, and under this should have become part of Wisconsin. In 1804, all of Minnesota w. of the Mississippi became the n. end of upper Louisiana (with the present Iowa, Missouri, Arkansas). It was from 1812 that the United States first had control of the region. Fort Snelling was established 1821, and St. Paul dates from 1846. A bill to organize the territory was introduced in and passed by congress 1849, Mar. 3,

when the pop. was but 4,057. In 1837 the cession had been made by the Indians of a small tract between the St. Croix and the Mississippi, and 1851 the Sioux ceded all the land w. of the Mississippi as far as to the Big-Sioux river. 1857, Feb. 26, the enabling act for admitting the terr. into the union was passed, and 1858, May 11, M. became a state, the 32d of the United States, with a population of 150,037. As late as 1862 the Indians made an onslaught, over a large part of the state, upon the scattered settlements, massacred more than 700 people, took away captive 200, chiefly women, ravaged 30 cos., made 30,000 people homeless, and destroyed $3,000,000 worth of property. The civil war 1860–65 drew out of the state 25,052 men, nearly one-seventh its pop. in 1860. But rapid growth repaired all losses. The census of 1865 (under state law) showed a pop. of 250,099. Railroad construction had been early begun, and was energetically pushed. It occasioned a difficulty in the matter of bonds issued in aid of companies which failed, but this was ultimately settled satisfactorily, while the state had meanwhile grown immensely in pop., wealth, and every element of prosperity and greatness.

Government.—The state constitution was adopted 1857, Oct. 13, and the government organized 1858, May. The state administration consists of a gov., elected to serve two years; lieut.-gov.; sec. of state; treas.; and attor.-gen. Her votes for pres. and vice-pres. have been as follows: 1860, Abraham Lincoln and Hannibal Hamlin; 1864, Abraham Lincoln and Andrew Johnson; 1868, U. S. Grant and Schuyler Colfax; 1872, U. S. Grant and Henry Wilson; 1876, Rutherford B. Hayes and William A. Wheeler, 5; 1880, James A. Garfield and Chester A. Arthur; 1884, James G. Blaine and John A. Logan, 7; 1888, Benjamin Harrison and Levi P. Morton; 1892, Benjamin Harrison and Whitelaw Reid; 1896, William McKinley and Garret A. Hobart 9; 1900, William McKinley and Theodore Roosevelt; 1904, Theodore Roosevelt and Charles W. Fairbanks; 1908, W. H. Taft and J. S. Sherman.

Population.—(1860) 172,023; (1870) 439,706; (1880) 780,773; (1900) 1,751,394; (1910) 2,075,708.

Bibliography.—Flandran, *The History of Minnesota* (1900); Neill, *The History of Minnesota.*

MINNESOTA, THE UNIVERSITY OF: a state institution at the head of the system of public education in Minnesota, located in Minneapolis, on the e. bank of the Mississippi river. Its grounds comprise about 50 acres, and are so situated as to command a good view of the Falls of St. Anthony and of the Mississippi river. The University farm, belonging to the State School of Agriculture contains 250 acres and is three miles distant from the University. The charter of the University was granted by the territorial legislature 1851, 13 Feb., when the territory contained less than

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10,000 inhabitants. The state constitution, adopted 1857, 13 Oct., confirmed to the University all rights previously granted to it by the legislature. The institution was organized as a college in 1869, and opened 15 Sept., 1869, with a faculty of nine professors. William W. Folwell, LL.D., a graduate of Hobart College, was its first president and filled the office till 1884. Cyrus Northrop, LL.D., a graduate of Yale University and for 21 years a professor in Yale, was elected president in 1884.

The University consists of the following departments: (1) the College of Science, Literature and Arts; (2) the College of Engineering and Mechanic Arts; (3) the College of Agriculture; (4) the College of Law; (5) the College of Medicine and Surgery; (6) the College of Homœopathic Medicine and Surgery; (7) the College of Dentistry; (8) the College of Pharmacy; (9) the School of Mines; (10) the School of Chemistry; (11) the School of Agriculture; (12) the Graduate Department. The management of the University is vested in a board of 12 regents, of whom the governor of the state, the president of the University, and the state superintendent of public instruction are ex-officio members, and nine others are appointed by the governor and confirmed by the senate. The financial affairs of the University, except the salaries of instructors, are regulated by an act of the legislature passed in 1901, subject to the approval of the state board of control. The real estate, land and buildings of the University are valued at about $2,000,000, and its invested fund is about $1,400,000. The total attendance of students in 1903 was 3,788, of whom 1,179 were women. The number of professors and instructors is about 300. There are 18 buildings on the University campus, and 13 buildings on the farm, with which the School of Agriculture and the experiment station are connected.

The University is supported by the state. Its fees required of students are nominal, except in the professional schools. One of the finest buildings on the campus is the gift of the late ex-Governor John S. Pillsbury, who was for many years president of the board of regents, and to whose never-failing devotion the institution is largely indebted for its prosperity. The library contains 110,000 volumes. The requirements for admission are a full four years' course in a high school or its equivalent. Candidates for admission to the College of Medicine and Surgery are required to have completed, in addition to a high school course, two years in the University or some other reputable college. A special six years' course has been provided by which both the degrees of B.A. and M.D. may be obtained—the first two years being in the College of Science, Literature and Arts, with a select course of studies; and the last four years being the regular course in medicine.

MINNESO'TA (or St. Peter's) River· rising near the n.e. boundary of S. Dakota, flowing s.e. 300 m. to South Bend, then n.e. 120 m., and emptying into the Mississippi at Mendota. It is navigable 40 m. by steamboats.

MINNETONKA, *mĭn-ė-tŏn'ka*, Lake: popular summer and fishing resort in the 'Big Woods' of Minn.: on the Pacific branch of the Minneapolis and St. Louis railroad: 15 m. s.w. of Minneapolis, 25 m. s.w. of St. Paul. It has communications with both cities by 6 regular trains each way during the summer. It covers about 16,000 acres, broken into 25 bays, and has an irregular shore-line of about 200 m. The bays are connected by narrow navigable inlets, and the banks and numerous islands are covered with maple, oak, basswood, elm and other forest trees. There are three villages on the lake: Excelsior on the s. shore; Waysata on the n ; and Mound City at the extreme end of Upper Lake. The large hotel which formerly accommodated transient summer guests was recently burnt down; many pretty and costly cottages have been erected along the lake by citizens of Minneapolis and St. Paul.

MINNEWASKA, Lake: deep and clear lake, about three-quarters of a m. long, $\frac{1}{4}$ m. wide, held inclosed as in a rocky bowl on the summit of the Shawangunk Mts., Ulster co., N. Y.; 1,800 ft. above sea-level; 10 m. s.w. of New Paltz on Walkill Valley r.r.: 19 m. w. of the Hudson at Poughkeepsie, 98 m. n. of New York. The rock-formations here are very striking, the scenery is picturesque, and the air invigorating: these, with excellent hotels, make it a favorite summer-resort. Mohonk Lake is 9 m. distant.

MINNEWAUKAU, *mĭn'ė-waw-kaw'*, Lake [Indian, Lake of the Great Spirit, Waukau] (formerly known as Devil's Lake): remarkable body of salt water in Ramsey and Benson cos., N. D.; 55 m. long and 3–10 m. wide.

MINNOW, n. *mĭn'nō* [Gael. *miniasg*, a minnow—from *mion*, small, and *iasg*, a fish; *meanbh*, little, small: F. *menu*, small: L. *minĭmum*, the least], (*Leuciscus phoxinus*): very small fish of same genus with the roach, dace, chub, etc., of a more rounded form than most of its congeners, a common native of streams with gravelly bottoms in most parts of Britain. It seldom exceeds three inches in length, the head and back of dusky olive color, the sides lighter and mottled, the belly white, or, in summer, pink. Minnows swim in shoals, feed readily either on animal or vegetable substances, if sufficiently soft, and are said to be very destructive to the spawn of salmon and of trout. The M. is a fish of very pleasant flavor. A casting-net affords the means of taking it in sufficient abundance. It is favorite bait for pike and trout. Several other fishes are called M. in N. Amer.

MINO BIRD: see Mina Bird.

MINOR, *mēnōr*, JAKOB, Austrian scholar: b. Vienna 1855, April 15. He was educated at Vienna and Berlin, and became professor of German language and literature at Prague (1884) and of Teutonic philology at Vienna. Besides numerous editions of texts, he published *Neuhochdeutsche Metrik* (1893), an excellent study in prosody, and a valuable incomplete work on Schiller (2 vols. 1890).

MINOR, *mīnōr*, ROBERT CRANNELL, American painter: b. New York 1840; d. 1904. He studied at Barbizon and became a pupil of Diaz there. He subsequently went to Antwerp and was taught by Van Luppen and Boulanger, making a specialty of landscape. He exhibited in the salons of Antwerp and Paris, in the Royal Academy of London, as well as in New York, Boston and Chicago. Among his best known works are: *Dawn; Sundown; The Stream; October Days; Morning in June; Sunrise on Lake Champlain; Cradle of the Hudson;* and *A Mountain Path.*

MINOR, VIRGINIA LOUISA, American reformer: b. Groochland county, Va., 1824, March 27. She was educated at Charlottesville Academy (Va.), and in 1843 was married to a relative, Francis Minor, with whom she removed to St. Louis, Mo., in 1846. She was engaged in nursing the soldiers during the Civil War, and since the war has been connected with woman's suffrage movements. She was the originator of the movement in Missouri in 1866, organized an association in 1867, and was president of the convention which met in St. Louis in 1869. In 1872 she brought the question of woman's suffrage as a right before the Supreme Court of the United States, where decision was rendered against her.

MINOR, a. *mī'nẽr* [L. *minor*, less: comp. AS. and Ir. *min*, small: Icel. *minnr*, less] less; smaller; inconsiderable; petty; unimportant; in *music* (see below): N. a person under age; one under 20 years; in Scotch *law*, a male person between the ages of 14 and 21 years, and a female person between 12 and 21 (see INFANT: RESTITUTION: GUARDIAN): in *logic*, the second proposition of a regular syllogism, called the *minor term*. MINORITY, n. *mĭ-nŏr'ĭ-tĭ*, the period from birth till 21 years of age; the smaller number, as distinguished from the *majority*. MINOR KEY in *music*, a key that takes a minor third; that arrangement of tones and semitones in a piece of music, often considered appropriate for solemn and mournful subjects (see MINOR in MUSIC, below). MINOR CANONS, priests in certain of the cathedrals who rank next to the canons, and are responsible for the daily service. MINORITES, n. plu. *mĭn'ŏr-īts* [L. *Frātrēs minōrēs*, the Lesser Brothers]: a name of the Franciscan order of friars, which has left its trace in the popular designation of several places in English and other European cities. See FRANCISCANS. MI'NOR-PLAN'ET, n. in *astron.*, an asteroid, or planetoid.

MI'NOR: term used in music. 1. In the nomenclature of intervals. The interval between any note and another is named according to the number of degrees between them on the scale, both notes included. The interval between C and E is called a third; that between E and G also is a third; but these intervals are unequal, the one consisting of four semitones, the other of three; the former is therefore distinguished as a major, the latter as a minor interval. 2. M. is applied also to one of the two modes in which a musical passage may be composed, which is then said to be in the M. key. The scale of the M. mode differs from that of the major mode in the third of its key-note being a M. instead of a major third. See MUSIC: MODE, in Music.

MINOR BARONS: inferior class of barons, in England under the feudal system from the Conquest (1066) to near the close of the reign of Henry III. (about 1265), who held lands under military tenure not from the sovereign but from the principal barons. The word baron, in the earliest period of feudalism, signified one who held lands of a superior by military tenure. The superior might be the sovereign, or he might be an earl or other eminent person, who held of the sovereign. According as he was the sovereign on one hand, or an earl on the other, the baron holding under him was, in the earliest sense of the distinction, a greater or minor baron. At the Conquest, a large part of the soil of England was parcelled by William the Norman among his military retainers, who were bound in return to perform services, to do homage, and to assist in administering justice, and in transacting the other business done in the court of the king. 400 of these tenants-in-chief of the crown are enumerated in Domesday (q.v.), including among them 'vicecomites' and 'comites,' who together constituted the body of men called the Barons of England. As the sovereign was entitled to demand from the barons military service, homage, and attendance in the courts, so, many of the principal barons, particularly such of them as were earls, had military tenants, from whom they in turn received homage and assistance in administering justice in their baronial courts. These tenants were barons of the barons, or, in the earliest sense, minor barons; but by the usage of England, from the Conquest downward, they were seldom called barons, that term having been generally restricted to the former class, the holders of land direct from the crown, who were next to the king in dignity, formed his army and his legislative assembly, and obtained the Great Charter from King John. The subinfeudation which produced the minor barons was checked by a statute of Edward I., directing that all persons acquiring lands from a subject should hold, not of that subject, but of his superior.

Out of the 'commune concilium' of the king, at which all his barons were bound to attend, arose the parliament. It is not till the close of Henry III.'s, or beginning of Edward I.'s reign that we find a select number instead

of the whole barons attending. The exact period of the change, and the way in which it was made, are still among the obscure points of English history; it has been thought that after the rebellion which was crushed at the battle of Evesham, Henry III. summoned only those barons who were most devoted to his interest. From this period, a new distinction between major and minor barons arose, the latter term being no longer applied to the barons of the barons, but to those barons of the crown who were no longer summoned by writ to parliament. The word baron was more and more used in the restricted sense of a baron of parliament, and the right or duty of attendance came in process of time to be founded, not on the land tenure, but on the writ. See HENRY III.

In Scotland, the barons (or lairds) were such persons as held their lands directly of the crown. They were the king's advisers, witnessed his charters, and possessed a civil and criminal jurisdiction. All had to give attendance in the Scottish parliament, which consisted of the earls and barons sitting together. After the reign of James I., some of the more powerful barons appear more exclusively as lords of parliament, those whose incomes were below a certain amount obtaining a dispensation from attendance: yet all possessed a right to attend parliament till 1587, when the barons not specially created lords of parliament were required, in place of personally attending, to send representatives of their order from each sheriffdom. The term baron, however, still continued in Scotland to be applied to the whole body of tenants *in capite*, such of them as were lords of parliament being distinctively major, and the others minor barons; but all continuing till 1747 to possess extensive civil jurisdiction, and a criminal jurisdiction, from which only treason and the four pleas of the crown were excluded. The representative minor barons sat in the same house with the major barons, and until the union their votes continued to be recorded as those of the 'Small Barrounis.'

MINORCA, *mĭn-awr'ka* or *mē-nōr'kâ:* largest of the Balearic Isles (q.v.), after Majorca, from which it is distant 25 m. n.east. It is 31 m. long, 13 m. in greatest breadth; 284 sq. m. Its coast, broken into numerous bays and inlets, is fringed with islets and shoals, and its surface, less mountainous than that of Majorca, is undulating, rising to its highest point in Mount Toro, 4,793 ft. above sea-level. Its productions are similar to those of Majorca, though it is neither so fertile in soil nor so well watered. The chief towns are Port Mahon (q.v.), and Ciudadela. The annual exports are worth $550,000; imports, $500,000. Pop. about 40,000.

MINOS, *mī'nos:* name of two mythological kings of Crete. The first is said to have been the son of Jupiter and Europa, and brother of Rhadamanthus, and father of Deucalion and Ariadne, and, after his death, a judge in the infernal regions.—The second of the same name was

grandson of the former, and son of Lycastus and Ida. To him the celebrated *Laws of Minos* are ascribed, in which he is said to have received instruction from Jupiter. He was the husband of that Pasiphaë who gave birth to the Minotaur (q.v.).—Homer and Hesiod know of only one Minos, King of Cnossus, and son and friend of Jupiter.

MINOT, *mī'nŏt,* CHARLES SEDGWICK, S.D., LL.D.: American scientist: b. West Roxbury, Mass., 1852, Dec. 23. He was graduated from the Massachusetts Institute of Technology in 1872, studied also at Leipsic, Paris, Würzburg, and Harvard; was lecturer on embryology and instructor in oral pathology and surgery in the Harvard Medical School in 1880-3, instructor in histology and embryology in 1883-7, assistant professor in 1887-92, professor from 1892-1905, and since 1905 James Stillman professor of comparative anatomy. He invented two forms of the microtome, an instrument for the automatic preparation of sections for microscopical study. He was elected president of the American Society of Naturalists in 1894, and president of the biological section of the American Association for the Advancement of Science in 1901. Among his works are: *Bibliography of Vertebrate Embryology* (1893); and *A Laboratory Text-Book of Embryology* (1903).

MINOTAUR, n. *mĭn'ō-tawr* [Gr. *minōtau'rŏs;* L. *minotau'rus*—from *Minōs,* Minos; Gr. *tauros,* a bull]: in *anc. myth.,* a monster with the head of a bull and the body of a man; one of the most repulsive conceptions of early Grecian mythology. He is represented as the son of Pasiphaë and a bull for which she had conceived a passion. Minos (q.v.), the husband of Pasiphaë, shut him up in the Cnossian Labyrinth, and there fed him with youths and maidens, whom Athens was obliged to supply as an annual tribute, till Theseus, with the help of Ariadne (q.v.), slew the monster. The minotaur is, with some probability, regarded as a symbol of the Phœnician sun-god, Melkarth, with whose worship the bull-worship was cognate.

MINOT'S LEDGE LIGHT-HOUSE, *mī'nots:* noted structure on a projecting point of the Mass. coast, about 8 m. e.s.e. of Boston light, where the ledge of Cohasset is most dangerous to vessels coming into Boston harbor. The rock is 1½ m. off shore, with barely a circle of 25 ft. uncovered at low tide. It was a ledge most difficult to build on. By an act of congress 1847, the first light-house was erected, with an octagon base, of which each side was 9½ ft., and the distance across 25 ft. Iron piles of 10 in. diam. were set 5 ft. into the rock, at each angle of the octagon, and in the centre; and firmly braced and tied with wrought-iron braces. At 55 ft. above the rock the piles were fixed securely into a heavy casting, and above this was constructed the keeper's dwelling,

surmounted by the light. The structure was finished 1849; and 1851, Apr., was destroyed by one of the worst storms ever known on that coast. By act of congress 1852, a plan, approved by the secretary of the treasury 1855, was adopted for a new structure, to be a granite tower, in the shape of the frustum of a cone. The base is 30 ft. in diam.; 40 ft. are built up solid, with the courses securely tied by galvanized wrought-iron dowels, 3 in. in diam., and the stones of each course dovetailed. From early in 1855 to the end of 1857 was consumed in preparing the rock and laying 4 stones. Six courses were laid 1858, and the solid 40 ft. completed 1859, with 20 ft. of the house above. It was finished, and the light in use, by the end of 1860.

MINSK, *mĭnsk:* government and province of W. or White Russia, s.e. of Wilna; 34,860 sq.m. The people are chiefly Russians, Lithuanians, Poles, and Jews, with a small percentage of Tartars and gypsies. Five-sevenths of the population profess the Greek religion. The chief exports are timber, salt, and corn, brought by river-carriage to the Baltic and Black Sea ports. The principal manufactures are fine cloths, linen, and sugar. The soil is not fertile, and woods and marshes, with sandy wastes abound. Cattle and sheep breeding are carried on. The inhabitants of the s. or marshy portion of the province are subject to that dreadful disease, the *Plica Polonica* (q.v.). Pop. 2,156,123.

MINSK: chief town of the govt. of Minsk; on the Svislocz, an affluent of the Beresina, 465 m. by rail w. of Moscow. It is built mostly of wood, but has many handsome stone edifices, among which are the Greek and Rom. Cath. cathedrals and seminaries, the Church of St. Catharine, a number of educational and philanthropic establishments, a public library, and a theatre. The chief manufactures are woolen cloth and leather. Pop. 91,494.

MINSTER, n. *mĭn'stėr* [AS. *mynstre;* OF. *monstier*—from mid. L. *monastĕrĭŭm,* a monastery, then the church attached to it]: the church of a monastery or convent; a cathedral church. See MONASTERY.

MINSTREL, n. *mĭn'strĕl* [OF. *menestrel,* a workman, a minstrel—from mid. L. *ministrālis,* an artisan, a servant—from mid. L. *ministĕrĭŭm;* F. *ministère,* occupation, an art]: in the *middle ages,* one of a body of men whose profession it was to administer their skill in poetry and music by recounting heroic deeds in verse, often composed by themselves, and to sing them to the harp; a national poet who writes poetry recounting the heroic deeds of the past; a portrayer in verse of national deeds and character, and of home life in the past; a musician. MINSTRELSY, n. *mĭn'strĕl-sĭ,* the art or occupation of a minstrel; system of ballads restricted to certain events, or to a certain age; music, generally instrumental; a number of musicians.—*Minstrels,* usually strollers, often

accompanying their song with mimicry and gesture, were exceedingly popular, supplying a rude entertainment suited to the taste of the times. Their songs were mostly martial, tending to cultivate a heroic spirit accordant with the chivalry of the middle ages. In general, they correspond in England to the earlier Bards (q.v.) of Wales, Ireland, and Scotland, though as a class much inferior. In the reign of Richard I. they were at their height of privilege: the king, himself a minstrel, gathered them in numbers to his court, with Troubadours (q.v.) from France, and gave them honors and rewards. From the time of Edward IV., the order declined, and in the time of Elizabeth, minstrels were by law classed with jugglers and peddlers, as vagabonds and beggars. Of far higher grade were the Troubadours (q.v.) and Trouvéres (q.v.), who sang mostly of love, and in other respects differed from the minstrels. See also NEGRO MINSTRELSY.

MINT, n. *mĭnt* [Dut. *munte;* Ger. *münze*—from L. *monētă*, money, the stamp with which it was struck: Dut. *munten*, to mint, to strike money]: place where money is coined by authority of government: figuratively, a source of abundant supply; a place in which something is invented: V. to coin; to invent or fabricate. MINT'ING, imp. MINT'ED, pp. coined. MINTAGE, n. *mĭnt'āj*, that which is coined or stamped; duty paid for coining.

MINT: an establishment where metals are converted into coins; now generally a government institution. The final processes are described under COINAGE; but a number of antecedent ones require explanation. Generally speaking, the precious metals in their natural state are not pure and the foreign elements must be separated in order to fit them for coinage. This is done by *melting and refining*. The former process eliminates a very large part of the inferior metals by combination; the latter, by means of acids or electrical methods, parts what may remain, particularly the silver from the gold; these two last named metals being almost invariably found in combination.

In order not to burden the mints with too great a task in this particular, the laws generally provide that, in order to be acceptable, precious metals must be of a minimum degree of purity or *fineness;* thus metal under .600 fine, or three-fifths pure, may be rejected in the United States mint offices. Private smelting and refining establishments exist for the 'reduction' of such ores and bullion; and the greater part of the gold and silver produced is in fact refined in these. Mints also accept bullion in other than natural forms; coins, jewelry, plate, etc., which are duly melted down for the purpose.

Since the acquisition of precious metals is most desirable, governments usually provide liberal regulations to attract sellers thereof. The formerly existing heavy charges for melting and coining have been reduced to a

minimum, some abolished altogether. In theory the owner of bullion brings it to the mint for coinage, and when, in its turn, it has been converted receives the resulting pieces; in fact, however, any coin serves his purpose equally well, and generally he is paid from any coin which the mint may have on hand, or by check upon the government's treasury. Yet the mints reserve the right to a short delay, partly in order to assure themselves of the character of the metal.

In the United States the procedure is substantially as follows: Small tenders of bullion are usually paid for at once at an approximate valuation, readily determined by weighing; larger deposits are paid for to the extent of 90 per cent. of the value indicated, when the fineness of the metal can be approximated; other tenders must await the actual determination of value after melting and *assaying*, which latter term designates the process of ascertaining the fineness of the metal. Gold is paid for at the fixed rate of $20.67\frac{1}{2}$ per fine ounce; silver at about the market value for the day; but except when needed for coinage, only that silver is bought which is found in gold deposits.

A receipt is given the depositor stating the ascertained weight of the bullion. Each deposit of substantial quantity is treated separately. The bullion, or coin, is placed in a crucible, or melting pot, and subjected to sufficient furnace heat to render it fluid; by skillful manipulation almost all of the foreign substances are eliminated and the mass is kept homogeneous. The contents of the crucible are then poured into moulds and bars are cast; from each of these, small quantities are taken from the ends and from the middle to obtain a fair sample of the mass, and delivered to the assayer. If the bar be found not homogeneous—the same fineness throughout—it must be again subjected to the melting; otherwise it is passed and paid for. But since our standard fineness for coinage is .900, a charge is made for refining in case the bar is below the standard, and for the copper needed to alloy it if it prove higher than the standard; also for parting the silver from the gold. Accurate records are kept of each melt, every bar being stamped with a number, the weight and the fineness.

To bring a lot of bars to the legal standard they are classified and assorted according to fineness and prepared for the refining and parting processes. To facilitate the operations it is found desirable that the proportion of silver and gold in the mass be not less than $2\frac{1}{3}$ to 1; if requisite, silver is added. Copper in the mass is not a deterrent. This is then again melted (in about 4,000 oz. lots) and when thoroughly fused and mixed is poured with ladles into cold water in tanks in such a manner as to produce globules about the size of pop-corn. These are then placed in jars of nitric acid and boiled; being in small particles the acid works upon the metal more

effectively; its affinity for silver and the other metals and its lack of affinity for gold causes the parting; the gold being heaviest falls to the bottom; this sediment is washed in water and is practically pure gold.

The liquid solution contains the silver; it is drawn off and combined with salt water, the chlorine in which separates the silver, forming a chloride, which also settles at the bottom; the remaining liquid is filtered off; hot water, granulated zinc and sulphuric acid are added to the chloride and these free the silver.

Instead of this nitric acid process sulphuric acid is frequently used; the metal combination differs somewhat but in general the operation is similar, except that copper is used to precipitate the silver. The electrolytic process, a recent invention, is used generally in private refineries, but recently also introduced in the Denver mint of the United States. The metal is separated by means of an electric current operating in a solution of the metals and acids. While it was formerly employed chiefly for refining silver, it is now also used for gold, with excellent results, eliminating more of the foreign substances than any other process.

The granulated, almost pure, gold (or silver) resulting from the refining is then melted, cast into bars and assayed. A portion of the product is retained in this shape for industrial use and for exporters of gold, who prefer these high-grade bars. For coinage purposes sufficient pure copper is weighed out to combine with the bars in 'melts' so as to produce metal of the exact standard fineness. Great care must be exercised to get this exact and to have the metal homogeneous. An additional test in assaying is therefore applied; granules are taken from the molten metal beside the several samples from the *ingots*, or resulting bars, prepared for the coiner. If not satisfactory they are remelted and the variation corrected.

It is perhaps unnecessary to say that every bit of metal, even the minute samples taken by the assayer, are saved and accounted for as if they were money; accounts are kept of the waste, which while insignificant is yet sufficiently valuable to have made it a feature to save the sweepings of the floors, chimneys, etc., of the buildings.

Assaying is one of the most precise processes. The small samples of bullion taken from bars and ingots for the purpose are weighed upon scales so sensitive that they show the variation in weight of a piece of paper before and after a word has been penciled thereon; this is expressed in the fiftieth of a milligramme: (milligramme, 1000 gramme, gramme = 15.432 grains; hence sensitiveness is .0031 of a grain).

To the sample of gold to be treated, there is added a small quantity of silver and copper; each is duly weighed; then enclosed in a coverlet of pure lead foil, also weighed.

The combination of the metals facilitates the operation. Rolled into a small pellet this combination is placed in a *cupel* or small crucible, of very porous material (bone-ash, etc.), and subjected to intense heat in a small gas furnace. The melting which follows causes all particles of metal other than gold and silver to be eliminated or absorbed by the cupel.

The pellet of gold and silver remaining after cooling is weighed; rolled out into a very thin strip and subjected to nitric acid, which separates the silver as in the refining process; the silver being recovered by the use of salt water. Thus a quantity of granulated pure gold and silver is obtained. The proportion which these bear to the total is ascertained by weighing and calculating the differences between the resulting weights and those taken before. The result is expressed in ten-thousandths.

All of the samples are similarly tested; and unless all those taken from one bar show the same results, or within a minute fraction thereof, a further test of other samples must be made, or the bar must be remelted if differences are shown. A margin of difference, known as *tolerance,* is permitted; and this is rarely exceeded anywhere; most mints operate well within the margin, which in the United States is $\frac{1}{1000}$ for gold and $\frac{3}{1000}$ for silver.

Preparation of Dies.—The mint establishments have their own designers, engravers, and machinery for the making of dies used for coinage.

A design having been determined upon—a matter of no little importance to effect a combination of artistic and practical results—a model thereof is prepared in some soft material, by the engraver, in size several times larger than the proposed coin; from this an electrotype is made, carefully examined and finished; a reduced copy thereof, the size of the coin to be struck, is made in soft steel with a reducing lathe, operating a cutting drill, slowly and accurately. This copy is most carefully finished by the engraver, the lathe being unable to produce all of the delicate features of the design. When perfected this is hardened.

If the finished copy be *in relief* it is of course to be used as a 'hub' to transfer the design to other pieces of soft steel under great pressure; these after hardening are the coinage dies, and as duplicates are constantly required the relief method is usually employed. If duplicates are not necessary the reduction may be *intaglio,* and the die when hardened is ready for work.

In the United States there are today four mints, the original one in Philadelphia, established 1792, the one in New Orleans dating from 1838, the one in San Francisco dating from 1854, and the one recently opened at Denver. Government assay offices exist in New York, at St. Louis, Mo.; Charlotte, N. C.; Deadwood, S. D.; Helena, Mont.; Boise, Idaho; and Seattle, Wash.

MINT, *n. mĭnt* [AS. *mynte;* L. *mentha;* Gr. *minthē*, mint], (*Mentha*): genus of plants, of nat. order *Labiatæ;* with small, funnel-shaped, 4-fid, generally red corolla, and four straight stamens. The species are perennial herbaceous plants, varying considerably in appearance, but all with creeping root-stocks. The flowers are whorled, the whorls often grouped in spikes or heads. The species are widely distributed over the world. WATER M. (*M. aquatica*), grows in wet grounds and ditches. CORN M. (*M. arvensis*), is a weed in cornfields and gardens. These and most of the other species have erect stems. All the species contain an aromatic essential oil, in virtue of which they are more or less medicinal. The most important species are SPEARMINT, PEPPERMINT, and PENNYROYAL.—SPEARMINT or GREEN M. (*M. viridis*) is a native of almost all temperate parts of the globe; it has erect smooth stems, one to two ft. high, with whorls of flowers in loose cylindrical or oblong spikes at the top; leaves lanceolate, acute, smooth, serrated, destitute of stalk, or nearly so. It has a very agreeable odor.—PEPPERMINT (*M. piperita*), a plant of equally wide distribution in temperate parts of the world, is very similar to spearmint, but has the leaves stalked, and the flowers in short spikes, the lower whorls somewhat distant from the rest: it is readily recognized by the peculiar pungency of its odor and of its taste.—PENNYROYAL (*M. pulegium*) unlike the Amer. plant, has a much-branched prostrate stem, which sends down new roots as it extends in length; the leaves ovate, stalked; the flowers in distant globose whorls. Its smell resembles that of the other mints.—All these species, in a wild state, grow in ditches or wet places. All are cultivated in gardens; and peppermint largely for medicinal use and for flavoring lozenges. *Mint Sauce* is generally made of spearmint; which is used also for flavoring soups, etc. A kind of M. with lemon-scented leaves, called BERGAMOT M. (*M. citrata*), is found in parts of Europe, and elsewhere, and is cultivated in gardens. Varieties of peppermint and horse-mint (*M. sylvestris*), with *crisped* or inflato-rugose leaves, are much cultivated in Germany under the name CURLED M. (*Krause-minze*); the leaves being dried and used as a domestic medicine, and in poultices and baths. All kinds of M. are easily propagated by parting the roots or by cuttings. Most of them bloom in Aug.—Of different genera are *Monarda punctata*, also called Horse-M., and *Pycnanthemum linifolium*, also called Mountain-M.; also *Nipata Cataria*, Cat-M. or CATNIP (q.v.). It is said that mice have great aversion to M., and that a few leaves of it will keep them at a distance.

Peppermint, Pennyroyal, and Spearmint, are used in medicine. The pharmacopœias contain an *aqua*, *spiritus*, and *oleum* of each of them; the officinal part being the herb, which should be collected when in flower. *Peppermint* is a powerful diffusible stimulant, and, as such, is antispasmodic and stomachic, and is much employed in the treatment of gastrodynia and flatulent colic. It is

extensively used also in mixtures, for covering the taste of drugs. *Penny-royal* and *spearmint* are similar in their action, but inferior for all purposes to peppermint. The ordinary doses are one to two ounces of the *aqua*, a drachm of the *spiritus* (in a wine-glassful of water), and three to five drops of the *oleum* (on a lump of sugar).

MINTURN, *mĭn'tėrn*, ROBERT BOWNE: 1805, Nov. 16 —1866, Jan. 9; b. New York. At the age of 14 he entered a counting-house, but applied his spare moments to literary studies. In 1825 he formed a partnership with Charles Green; in 1830 he became a member of the firm of Fish & Grinnell, afterward Grinnell, Minturn & Co., which under his lead became one of the principal houses in the shipping line in the world. He was one of the founders of St. Luke's Hospital, and was identified with many other charitable enterprises. Upon the organization of the Union League Club he was chosen its pres., and held the office until his death in New York.

MINUEND, n. *mĭn'ū-ĕnd* [L. *minuend'us*, to be diminished—from *minŭō*, I lessen]: in *arith.*, the number that is to be lessened; the number from which another is to be subtracted.

MINUET, n. *mĭn'ū-ĕt* [F. *menuet*, a dance—from *menu*, small—from L. *minūtus*, small]: a slow graceful dance —so named from the short steps in it; also the tune or air for it. The M. was originally from Poitou, France: its music is said to have been composed by Lully the Elder, and it was danced by Louis XIV. 1653 at Versailles with his mistress. The music of the M. is in $\frac{3}{4}$ time, and is still well known by the celebrated *Minuet de la Cour*, introduced in stage performances.

MINUIT, *mĭn'u-ĭt* (or MIN'UITS, or MIN'NEWIT), PETER: 1580–1641: colonial governor: b. Wesel, Rhenish Prussia. He was a deacon in the Walloon Chh.; removed to Holland; and, some years later, was appointed director for the Dutch W. India Co. at New Netherlands in Amer., in succession to William Van Huist, but with such enlarged powers as made him the first real governor. He landed on Manhattan I., 1626, May 4, and bought it of the Indians for goods of the value of $24. Sending to Holland a ship-load of skins and timber, with the news of his purchase of colony land, he built Fort Amsterdam; also a mill and warehouse; and, with new arrivals, had under him a colony of 300, which he governed with vigor and discretion. In 1627 he established commercial relations with the Plymouth colony, through a correspondence with Gov. Bradford. Abuses, leading to formation of the great patroon estates, caused his recall, 1631, Aug.; and he sailed for Holland 1632, March. Putting into Plymouth, Eng., he was detained on a charge of illegal trading on Eng. colonial ground, but, after diplomatic correspondence, was allowed to proceed, May 27. Not succeeding in Holland, in regaining credit and recovering his office, he went to Sweden 1637, and was engaged by the chancellor, Oxenstiern, to go out under the Sw.

W. India Co. M. sailed from Gothenburg 1637, with a body of Sw. and Finn. colonists, in two vessels, and coming into Delaware Bay, bought of the Indians the land between the s. cape and the falls near Trenton. In 1638, Mar., he undertook the erection of Fort Christiana, near the present site of Wilmington. In spite of vigorous Dutch protests and Indian dangers, and although, in 1640, from failure of provisions, the colony would have taken refuge with the Dutch at Manhattan I., if supplies had not arrived the day before the intended move, the New Sweden, as it was called, under M., proved successful, and was the first permanent European settlement of Delaware. M.'s death, however, near Fort Christiana, was followed, 14 years later, by Dutch aggression and annexation, 1655.

MINUS, n. *mī′nŭs* [L. *minus*, less]: in *arith.*, and *alg.*, the sign of subtraction, thus [—], which, placed between two quantities, means that the latter is to be subtracted from the former.

MINUSCULE, n. *mĭ-nŭs′kūl*, or MINUS′CULA [L. *minusculus*, very small—from *minus*, less]: minute kind of letter or character used in the mediæval MSS.

MINUTE, a. *mī-nūt′* [L. *minūtus*, little, small—from *minŭō*, I make less: It. *minuto*, slender: F. *menu*, small]: extremely small or slender; little; diminutive; attentive to small things; exact in details. MINUTELY, ad. *mī-nūt′lĭ*, in exact details. MINUTE′NESS, n. *-nĕs*, smallness; slenderness; great exactness.—SYN. of 'minute': fine; exact; critical; circumstantial; particular; small; slender; slight; detailed.

MINUTE, n. *mĭn′ĭt* [F. *minute*, a minute—from mid. L. *minūtă*, small in space or time: L. *minūtim*, in little pieces or morsels—from *minŭō*, I lessen: It. *minuto*, a minute]: small portion of time or duration; 60th part of an hour; 60th part of a degree (see SEXAGESIMAL ARITHMETIC): in *arch.*, 60th part of the diameter of the shaft of a classic column, measured at the base—used as a measure to determine the proportions of the order; a short sketch or note of an agreement, fact, or event; an outline or brief report in writing of the proceedings of any meeting or society or of the purport of any instrument; so called from being taken down shortly and in *minute* or small writing, to be afterward engrossed (see ENGROSS).—MINUTE, in *law*, is a memorandum or record of some act of a court or of parties; in the latter sense, it is used chiefly in Scotland, as in the case of minute of agreement, minute of sale, etc.: V. to put down in writing an outline of the proceedings of a meeting or society. MIN′UTING, imp. MINUTED, pp. *mĭn′-ĭt-ĕd*. MINUTELY, ad. *mĭn′ĭt-lĭ*, happening every minute; in detail. MINUTE-BOOK, the book in which the minutes are written. MINUTE-GLASS, a small sand-glass. MINUTE-GUNS, guns fired at short intervals, as signals of distress at sea, or of mourning. MINUTE-HAND, the hand of a clock or watch pointing out the minutes.

MINUTIA, n. *mĭ-nū′shĭ-ă*, MINU′TIÆ, n. plu. *-shĭ-ē* [L. *minūtĭă*, smallness, fineness—from *minūtŭs*, little, small: F. *minutie*, a trifle]: the smaller particulars or details.

MINX, n. *mĭngks* [contracted from MINIKIN, which see: comp. Gael. *mineag*, a gentle female]: a word of endearment; but generally, a pert, proud girl; a pert, wanton girl; a mink, which see.

MINY: see under MINE, an excavation.

MIOCENE, n. *mī′ō-sēn* [Gr. *meion*, less; *kainos*, recent]: in *geol.*, term introduced by Lyell to characterize the Middle Tertiary strata, which he supposes to contain a smaller proportion of recent species of mollusca than the newer Pliocene, and more than the older Eocene. For an account of the American M., see TERTIARY. Here only the foreign is noticed.

Strata of this age occur in Britain in two limited and far separated localities—in the island of Mull, and at Dartmoor in s.e. England. In this last district, they exist at Bovey Traeey, in a flat area ten m. long by two m. broad, and consist of clay interstratified with beds of imperfect lignites. Pengelly and Heer have reeently examined the strata of this small basin, and have found that all the plants are of Miocene age, and belong to the same speeies as those found in similar deposits, in continental Europe, Iceland, Greenland, and Arctic America. Their *facies* indicates a warmer climate than the present, and the geographical range of the species is unexampled in the existing flora. The Greenland M. presents a difficult problem, with its remains of vegetation of great luxurianee within 8° 15′ of the n. pole, where now the land is almost continuously covered with snow and ice, and the winter night extends through half the year. The Mull beds are at the headland of Ardtun, and consist of interstratified basalts, ashes, and lignites: there are three leaf-beds, varying in thickness from 1½ to 2½ ft., separated by two beds of ash, the whole resting on, and covered by strata of basalt, and the whole thickness is 131 ft. It is supposed that the leaf-beds were deposited in a shallow lake or marsh, in the vicinity of an active volcano. One of the beds consists of a mass of compressed leaves without stems, and accompanied with abundant remains of an equisetum, which grew in the marsh into which the leaves were blown. The leaves belong to dicotyledons and coniferæ, and are speeies similar to those of Bovey Traeey.

The Fahluns of France are of this age, as are also part of the Mollassi of Switzerland and the Mayence and Vienna basins. Of the same period are the highly fossiliferous deposits in the Sewalik Hills, India, containing the remains of several elephants, a mammoth, hippopotamus, giraffe, and large ostrich, besides several carnivora, monkeys, and crocodiles, and a large tortoise, whose shell measured 20 ft. across. The European beds contain the remains of the Dinotherium (q.v.).

MIOHIP′PUS: see HORSE, FOSSIL.

MIÖSEN, *mē-ö′zĕn:* lake in Norway, 36 m. by rail n.e. of Christiania; expansion of the river Lougen: length 56 m., greatest breadth 12 m. The scenery is beautiful, and the air invigorating. The lake is a favorite resort in summer.

MIOSTEMONOUS, a. *mī′ō-stĕm′ŏ-nŭs* [Gr. *meiōn*, less; *stēmōn*, a stamen]: in *bot.*, applied to a flower in which the stamens are neither equal to, nor a multiple of, the floral envelopes.

MIR, n. *mēr* [Rus.]: a communal division in Russia.

MIRABEAU, *mĭr′a-bō*, F. *mē-râ-bō′*, Honoré Gabriel Riqueti, Comte de: one of the greatest of French statesmen and orators: 1749, Mar. 9—1791, Apr. 2; b. Bignon, near Nemours: son of Victor Riqueti, Marquis de M. (1715–89). M. was descended, by his own account, from the ancient Florentine family of Arrighetti, who being expelled from their native city in 1268, on account of Ghibelline politics, settled in Provence. Jean de Riqueti or Arrighetti purchased the estate of Mirabeau 1562; his grandson, Thomas, happened to entertain here, in 1660, Louis XIV. and Cardinal Mazarin, on which occasion he received from the monarch the title of Marquis Victor Riqueti. The family had acquired wealth in mercantile business at Marseille. M.'s father was a vain and foolish man, wasted his patrimony, wrote books of philanthropy and philosophy, e.g., *L'Ami des Hommes* (5 vols. Par. 1755), and was overbearing in his own house: he procured no fewer than 54 *lettres de cachet* at different times against his wife and his children. M., the eldest son, was endowed with an athletic frame and extraordinary mental abilities, but was of a fiery temper, and disposed to excess. He became lieut. in a cavalry regiment; but continued to prosecute various branches of study with great eagerness, while outrunning his companions in a succession of disgraceful *liaisons*. An intrigue with the youthful wife of an aged marquis brought him into danger, and he fled with her to Switzerland, and thence to Holland, where he subsisted by his pen, among other productions of which, his *Essai sur le Despotisme* attracted great attention. Meanwhile, sentence of death was pronounced against him; and the French minister, at his father's instigation, demanding that he should be delivered up to justice, he and his paramour were apprehended at Amsterdam, and he was brought to the dungeon at Vincennes, and there closely imprisoned for 42 months. During this time he was often in great want, but employed himself in literary labors, writing an *Essai sur les Lettres de Cachet et les Prisons d'état*, published at Hamburg (2 vols. 1782), and a number of obscene tales, by which he disgraced his genius, though their sale supplied his necessities. After his liberation from prison, he subsisted chiefly by literary labor, and still led a very profligate life. He wrote many effective political pamphlets, particularly against the financial administration of Calonne,

receiving pecuniary assistance, it was said, from some of the great bankers of Paris; and became one of the leaders of the liberal party. When the states-general were convened, he sought to be elected as a representative of the nobles of Provence, but was rejected by them on the ground of his want of property; and left them with the threat that, like Marius, he would overthrow the aristocracy. At about this time Count M. seems to have begun to see the miserable folly of his wild and reckless youth, and to have sought to bring himself under at least some degree of control. Though it has been common to accuse him of every kind of vice, the evidence points to excesses in only one direction—though in that direction frightful and disgraceful, and undoubtedly the cause of his early death. In his more sober years, his better nature developed; and a virtue rare in that land at that time was manifested in M.—the virtue of political morality. His opinions were not for sale, though he supported himself by literary work. He purchased a draper's shop, offered himself as a candidate to the third estate, and was enthusiastically returned both at Aix and Marseille. He chose to represent Marseille, and by his talents and admirable oratorical powers soon acquired great influence in the states-general and national assembly. Barnave well characterized him as 'the Shakespeare of eloquence.' M. was characterized by large historical knowledge, logical force, and passionate enthusiasm. With his oratorical gifts, he united a singularly calm and balanced judgment in public affairs. He stood forth as the opponent of the court and of the aristocracy, but regarded the country as by no means ripe for the extreme changes proposed by political theorists, and labored, not for the overthrow of the monarchy, but for the abolition of despotism, and the establishment of a constitutional throne. To suppress insurrection, he effected, 1789, July 8, the institution of the national guard. In some of the contests which followed, he sacrificed his popularity to maintain the throne. As anarchy and revolutionary frenzy increased, the more decided did he become in resistance to their progress; but it was not easy to maintain the cause of constitutional liberty at once against the supporters of the ancient despotism and the extreme revolutionists. The king and his friends were long unwilling to enter into any relations with one so disreputable, but at last, under the pressure of necessity; it was resolved that M. should be invited to become minister. No sooner was this known, than a combination of the most opposite parties, by a decree 1789, Nov. 7, forbade the appointment of a deputy as minister. From this time, M., who never turned back from any course because of the number and power of the adversaries, strove in vain in favor of the most indispensable prerogatives of the crown, and in so doing exposed himself to popular indignation. He still continued the struggle, however, with wonderful ability, and sought to reconcile

the court and the Revolution. If the king and the people could have moved in the direction vigorously urged by M., the French Revolution would not have been the name of horror which it is on the page of history. In 1790, Dec., he was elected pres. of the Club of the Jacobins, and 1791, Feb., of the national assembly. Both in the club and in the assembly he showed great boldness and energy; but soon after his appointment as pres. of the latter, he sank into a state of bodily and mental weakness, consequent on his great exertions and his youthful debaucheries, and died in a few weeks. He was interred with great pomp in the church of Saint Genevieve, the 'Pantheon;' but his body was afterward removed to make room for that of Marat. A complete ed. of his works was published at Paris, 9 vols. 1825–27. His natural son, Lucas Montigny, published *Mémoires Biographiques, Littéraires et Politiques de Mirabeau* (2d ed. 8 vols. Par. 1841), the most complete account which we have of his life. See also Carlyle's sketch of M. in *Miscellaneous Essays*, and *French Revolution*. The *Life of Sir Samuel Romilly* presents Count M.'s character in a far more favorable light than has been familiar to the popular thought. Romilly, one of the purest of men, was M.'s intimate friend during his stay in England; and while not blind to his blemishes of character, and noting as one of his slighter faults his excessive vanity, records his conviction that 'great injustice has been done him;' and that in his public conduct 'he was desirous of doing good, that his ambition was of the noblest kind, and that he proposed to himself the noblest ends.' The acceptance of this judgment of charity leaves the impression still of a wrecked life.

MIRABILITE, n. *mĭ-răb′ĭ-līt* [L. *mīrab′ĭlĭs*, wonderful]: a name given to sulphate of soda or Glauber's-salt.

MIRABLE, a. *mĭ′ră-bl* [L. *mīrab′ĭlis*, wonderful]: in *OE.*, attracting admiration; wonderful.

MIRACLE, n. *mĭr′ă-kl* [F. *miracle*—from L. *mirac′ulum*, a wonder—from *miror*, I wonder or marvel at: It. *miracolo*]: *literally*, a marvel or wonder; thence, popularly, a supernatural event; something beyond human power to do; an event apparently contrary to the established course of things and effected by Divine power. MIRACULOUS, a. *mĭ-răk′ū-lŭs*, of the nature of a miracle; done by superhuman power; effected by Almighty power, and not by apparent natural causes. MIRAC′ULOUSLY, ad. *-lĭ*. MIRAC′ULOUSNESS, n. *-nĕs*, state of being effected by a miracle. MIRACLE-PLAY, an old dramatic entertainment, the subject of which was taken from the histories of the Old and New Testaments, or from the legends of saints and martyrs (see MYSTERIES).

MIR'ACLE: term commonly applied to certain marvellous works, e.g., healing the sick, raising the dead, changing of water into wine; ascribed in the Bible to some of the ancient prophets, and to Jesus Christ, and some of his apostles or servants. M. signifies simply that which is wonderful—a thing or a deed to be wondered at, being directly from the Latin *miraculum*, a thing unusual—object of wonder or surprise. The same meaning is the governing idea in the term applied in the New Testament to the Christian miracles, *teras*, a marvel, a portent; besides which, they are designated also as *dunameis*, powers, with reference to the power residing in the miracle-worker; and *sèmeia*, signs, with reference to the character or claims of which they were assumed to be the witnesses or guarantees. Under these different names, the one fact recognized is a deed done by a man, and acknowledged by the common judgment of men to exceed man's ordinary powers; a deed, which being above or beyond the common powers of nature as these are understood by men, bears witness to a *supernatural* interposition, or a *superhuman* aid.

In the older speculations on the subject, a M. was generally defined to be a violation or at least a suspension of the order of nature. While, on one hand, it was argued (as by Hume), that such a violation or suspension was absolutely impossible and incredible; it was maintained, on the other, that the Almighty, either by his own immediate agency, or by the agency of others, could interfere with the operation of the laws of nature, in order to secure certain ends, which, without that interference, could not have been secured, and that there was nothing incredible in the idea of a law being suspended or set aside by the person by whom it had been made. The laws of nature and the will or providence of God were, in this view, placed in a certain aspect of opposition to each other, as though clashing at points here and there, and the stronger arbitrarily asserting its superiority. Such a view has, with the advance of philosophical opinion, appeared to many to be inadequate as a theory, and to give an unworthy conception of the Divine character. The great principle of law—which is the essential principle of order or harmony—being the highest conception not only of nature, but of the infinite Divine Providence, in all its manifestations, has asserted itself more dominantly in the realm of thought, and led increasingly to the rejection of the apparently conflicting idea of 'interference,' implied in the old notion of M. Order in nature, and an unchanging will in God, are felt to be first and absolutely necessary principles. The idea of M., accordingly, which seems to be most readily accepted by Christian thinkers of the present day, has its root in this recognized necessity.

All law is to be regarded as the expression, not of a lifeless force, but of an infinitely wise and perfect will. All law must develop itself through natural phenomena; but it is not identified with or bound down to any neces-

sary series of these. If we admit the mainspring of the universe to be a living will, then we may admit that the phenomena through which that will, acting in the form of law, expresses itself, may vary without the will varying or the law being broken or even suspended. We know absolutely nothing of the mode of operation in any recorded M.; we only see certain results. To affirm that these results are either impossible in themselves, or necessarily violations of natural law, is to pronounce a judgment on imperfect data. We can only say that, under an impulse which we must believe proceeds from the Divine will, in which all law exists, the phenomena which we have been accustomed to expect have not followed on their ordinary conditions. But from our point of view we cannot affirm that the question as to *how* this happens is one of interference or violation; it is entirely possible and exceeding probable that it is one of higher and lower ranges of activity. The M. may be but the expression of the one Divine order and beneficent will in a new form, along lines fully in accordance with the order of nature, though not heretofore in the compass of our knowledge. We can no more claim to know all the lines of law that are known to infinite wisdom than we can claim to have created the firm unchanging order of the heavens and the earth.

Nature being but the plastic medium through which the will of the living God is ever manifested to us, and the design of that will being, as it necessarily must be, the good of his creatures, that theory of M. is certainly most rational which does not represent the ideas of laws and of the will of God as separate and opposing forces, but which represents the Divine will as working out its highest moral ends, not against, but through law and order, and evolving from these a new issue, when it has a special beneficent purpose to serve. And thus, too, we are enabled to see in M. not only a wonder and a power, but a sign—a revelation of Divine character, never arbitrary, always generous and loving, the character of one who seeks through all the ordinary courses of nature and operation of law to further His creatures' good, and whose will, when that end is to be served, is not restricted to any one necessary mode or order of expression. Rightly interpreted, M. is not the mere assertion of power, or a mere device to impress an impressible mind; it is the revelation of a will which, while leaving nature as a whole to its established course, can yet witness to itself as above nature, when, by doing so, it can help man's moral and spiritual being to grow into a higher perfection. Even the human will, when disciplined and wisely developed, can use natural laws in lines and to results which to the more limited mind seem contrary to all laws. Such activity is one of the constant characteristics of civilized life.

The evidence for the Christian miracles is of a twofold kind—external and internal. As alleged facts, they are supposed to rest on competent testimony, the testimony

of eye-witnesses, who were neither deceived themselves, nor had any motive to deceive others. They occurred not in privacy, like the alleged supernatural visions of Mohammed, but mostly in the open light of day, amid the professed enemies of Christ. They were not isolated facts, nor wrought tentatively, or with difficulty; but the repeated, the overflowing expression, as it were, of an apparently supernatural life. It seems impossible to conceive, therefore, that the apostles could have been deceived as to their character. They had all the means of scrutinizing and forming a judgment regarding them that they could well have possessed; and if not deceived themselves, they were certainly not deceivers. There is no historical criticism that would now maintain such a theory; even the most positive unbelief has rejected it. The career of the apostles forms throughout an irrefragable proof of the deep-hearted and incorruptible sincerity that animated them. The gospel miracles, moreover, are supposed in themselves to be of an obviously Divine character. They are, in the main, miracles not of ostentatious power, *mere* wonders; but of healing, of beneficence, in which the light equally of the Divine majesty and of the Divine love shines—witnessing to the eternal life which underlies all the manifestations of decay, and all the traces of sorrow in the lower world, and lifting the mind directly to the contemplation of the sphere in which that life dwells and acts.

MIRACLE PLAYS: The earliest dramatic representations of religious themes grew up within the church itself. At certain seasons of the year, tableaux of gospel scenes were shown to the people, a practice which still survives in the representations of the Nativity in modern Catholic churches. The introduction of action and music into these tableaux is easy to understand, particularly in view of the dramatic elements in the celebration of the mass, and in the ritual for special occasions, like the consecration of a church. Simple Latin words were next set to the music accompanying a given scene, and this text was called a *trope*. In time these tropes grew more elaborate, passages in the vernacular were introduced, and popular elements not taken from the Bible were added. Meanwhile, the little plays, which in the beginning had been given in the choir, were transferred to the nave, and set up against the pillars. So popular did these representations become, and so great was the concourse of spectators, that a move outside the building into the churchyard had to be made. Secular elements crept in very rapidly, and the plays were finally transferred to open spaces in the cities and towns. The liturgical drama reached its height in the 13th c.; by the beginning of the 14th c. it had largely passed out of the hands of the clergy, although representations continued to be given in many churches.

The growth of the miracle play in England is due to

the influence of the Normans. There are almost no evidences of dramatic impulse in England before the conquest. The earliest play of which there is mention by name is a *Play of St. Katherine,* at the beginning of the 12th c., produced under the direction of a Frenchman who afterwards became abbot of St. Albans. To the same century belongs the work of Hilarius, a pupil of Abelard, and perhaps of English birth. He wrote Latin plays on subjects taken from the Scriptures, and diversified them with refrains in Old French. A great impetus was given to the plays by the institution of Corpus Christi day, with its elaborate processions and outdoor ceremonial, and many came to be presented at this season, when the conditions of weather were likely to be favorable. In time the procession served as a mere preliminary to the dramatic performances to follow. A desire for more elaborate stage effects and a greater number of incidents within the plays was constantly increasing, until there developed out of the relatively simple early pieces long groups of plays of cyclic character, covering the principal events of the Scripture narrative, in both the Old and the New Testament. The series given at York in 1415 begins with the creation, and ends with the glorification of Mary and Jesus in heaven, embracing 48 separate pieces in all. These cycles were often not all given on one day, but extended over two or more days, or they were divided, and presented in succeeding years.

After leaving the churches, the plays soon passed into the hands of the guilds, or associations of tradesmen. In the 13th c. clerics were forbidden by papal edict to appear on the stage, but these prohibitions were frequently disregarded. The control of the plays by the guilds marks a period of great importance in the history of the English drama. Much care was devoted to the production and acting of the various pieces. The corporation of the city had general charge of the matter, deciding when the performances should be given, and dividing the various scenes among the several companies. An effort was made to have the play suit the character of the guild that gave it; the shipwrights showed the building of the ark, the watermen the flood, and so forth. The plays were given on movable stages called *pageants,* which consisted of 'high scaffoldes with two rowmes,' one beneath which was used as a dressing room, and one above, open on all sides to give a better view, and occasionally provided with a canopy. These wagons moved from place to place, repeating the performance at different stations. The number of these stations varied with the size of the town; there were sometimes a dozen or more. The pageant wagons were gaily painted and decorated. They were generally rectangular, but special shapes were required for the ark, or for hell-mouth, a huge painted head with open jaws belching fire

and smoke. The scenery was of a rude sort. Palaces, temples, and castles were sometimes represented by boxes or wickerwork covered with cloth. Occasionally the actors made use of the open space in front of the pageant; Herod's 'raging' appears to have been partly done in the street. The costumes were often expensive, but frequently grotesque. Herod was attired like a Saracen, with red gloves. Pilate always wore a green cloak, and wielded a huge club. God the Father was represented in person, and dressed all in white, with a gilt wig. The devils and the Evil One were made very realistic, and came to furnish a great deal of low comedy. Various accounts of sums paid for properties and costumes are still preserved.

Four cycles of miracle plays are still extant, the York, Chester, Coventry and Towneley or Woodkirk plays. The Towneley series, so called from the family who long owned the manuscript, much resembles the York cycle, and like it displays much vigor and humor. The Chester plays perhaps appeal more to modern taste. The religious passages are more reverent, the humor less coarse, and the versification less harsh. The Coventry plays are full of didacticism, and this, with the introduction of personified abstractions, relates them more closely than the others to the moralities. Fragments of other cycles have also survived. The Vulgate and the Apocrypha are the chief sources of the text. In places some tragic elevation is reached, marred, however, by repetition and moralizing. Melodramatic and ranting scenes were popular. The comic scenes are often very spirited, and clearly based upon observation of the life of the people. Anachronisms are common, and the supernatural is treated with great naïveté.

The miracle plays were at their best in the time of Chaucer. In the 15th c. the Moralities arose to compete with them for favor, but never equalled them in dramatic achievement. The miracle plays continued to be given until the beginning of the 16th c., but in the reign of Elizabeth they had ceased to be a vital force. Their influence in preparing the way for the Elizabethan drama was very great, however. They introduced elementary types of comedy and tragedy, farce and melodrama, and accustomed the people as a whole to dramatic conventions. They made a national drama possible in the time of Shakespeare, and kept the theatre from being a mere amusement for the nobility, or a diversion for a small group of literary people.

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MIRAC'ULOUS CONCEP'TION, The: production by the direct power of the Holy Spirit from the life and substance of the Virgin Mary, of the true and complete bodily humanity of Jesus Christ. It is the point at which the established Christian theology dates the essential union of the Son of God—the Word from everlasting—with humanity as subsisting in the flesh. See Incarnation (under Incarnate): Christ, The: Jesus Christ: Messiah: Christology: Chalcedon, Council of.

MIRAGE, n. *mĭ-râzh'* [F. *mirage*—from *mirer*, to look at carefully]: curious natural illusion, very common in certain localities, and as simple in its origin as astonishing in its effects. Under it is classed the appearance of distant objects as double, or as if suspended in the air, erect or inverted, etc. One cause of mirage is a diminution of the density of the air near the surface of the earth, produced by the transmission of heat from the earth, or in some other way; the denser stratum being thus placed *above*, instead of, as is usually the case, *below* the rarer. Now, rays of light from a distant object, situated in the denser medium (i.e., a little above the earth's level), coming in a direction nearly parallel to the earth's surface, meet the rarer medium at a very obtuse angle, and (see Refraction) instead of passing into it, are reflected back to the dense medium; the common surface of the two media acting as a mirror. Suppose, then, a spectator to be situated on an eminence, and looking at an object situated like himself in the denser stratum of air, he will see the object by means of directly transmitted rays; but besides this, rays from the object will be reflected from the upper surface of the rarer stratum of air beneath to his eye. The image produced by the reflected rays will appear inverted, and below the real object, just as an image reflected in water appears when observed from a distance. If the object be a cloud or portion of sky, it will appear by the reflected rays as lying on the surface of the earth, and bearing a strong resemblance to a sheet of water; also, as the reflecting surface is irregular, and constantly varies its position, owing to the constant communication of heat to the upper stratum, the reflected image will be constantly varying, and will present the appearance of a water surface ruffled by the wind. This form of mirage, which even experienced travellers have found completely deceptive, is frequent in the arid deserts of Lower Egypt, Persia, Tartary, etc.

In particular states of the atmosphere, reflection of a portion only of the rays takes place at the surface of the dense medium, and thus double images are formed—one by reflection, and the other by refraction—the first inverted, and the second erect. The phenomena of mirage are frequently much more strange and complicated, the images being often much distorted and magnified, and in

some instances occurring at a considerable distance from the object, as in the case of a tower or church seen over the sea, or a vessel over dry land, etc. The particular form of mirage known as *looming* is very frequently observed at sea, and consists in an excessive apparent elevation of the object. A most remarkable case of this sort occurred 1798, July 26, at Hastings, England. From this place the French coast is 50 m. distant; yet from the sea-side the whole coast of France from Calais to near Dippe was distinctly visible, and continued so three hours. In the Arctic regions it is a common occurrence for whale-fishers to discover the proximity of other ships by means of their images seen elevated in the air, though the ships themselves may be below the horizon. Generally, when the ship is above the horizon, only one image, and that inverted, is found; but when it is wholly or in great part below the horizon, double images, one erect and the other inverted, are frequently seen. The faithfulness and distinctness of these images at times may be imagined from the fact, that Captain Scoresby, while cruising off the coast of Greenland 1822, discovered the fact that his father's ship was in his vicinity from its inverted image in the sky. Another remarkable instance of mirage occurred 1854, May, when, from the deck of the British screw-steamer, *Archer*, then cruising off Oesel, in the Baltic, the whole English fleet of 19 sail, then nearly 30 m. distant, was seen as if suspended in the air upside down. Beside such phenomena as these, the famous *Fata Morgana* (q.v.) of the Strait of Messina sinks into insignificance. The *Spectre of the Brocken*, in Hanover, is another notable instance of mirage. The varieties are indeed numberless: see Brewster's *Optics*, Biot's *Traité de Physique:* for the mathematical theory of the mirage, see the works of Biot, Monge, and Wollaston. See also REFLECTION; REFRACTION.

MIRAN'DOLA, PICO DELLA. See PICO, GIOVANNI DELLA MIRANDOLA.

MIR'BANE. See NITRO-BENZOL.

MIRE, n. *mīr* [Icel. *myri*, a marsh: Sw. *myra*, a bog, a marsh: Dut. *moeyer*, mire—from *moer*, a bog]: deep mud; earth very wet and soft: V. to sink deep or fix in mud; to soil with mud. MI'RING, imp. MIRED, pp. *mīrd*. MIRY, a. *mī'rĭ*, covered with mire; muddy. MI'RINESS, n. *-rĭ-nĕs*, state of being miry.

MIRK, a., or MURK, a. *mėrk* [AS. *mire*, dark, murky: Icel. *myrkr*, dark, or darkness: Gael. *mureas*, sadness, gloom]: in *Scot.* and *OE.*, dark, gloomy: N. darkness; gloom. MIRKSOME, a. *mėrk'sŭm*, in *OE.*, dark; obscure. PIT-MIRK [AS. *pie;* Dut. *pik;* Scot. *pik;* Icel. *bik*, pitch]: in *Scot.*, very dark; pitch-dark.

MIRROR, n. *mĭr'ėr* [F. *miroir;* OF. *mireor*, a mirror—from mid. L. *mirārĕ*, to behold—from L. *miror*, I won-

der at, I admire]: any polished body capable of reflecting images of objects; a looking-glass: a pattern or example, as 'she was a *mirror* of grace': V. to reflect or shadow forth as in a mirror. MIRRORING, imp. *mĭr'ėr-ĭng*. MIR'RORED, pp. a. *-ėrd*, reflected as in a mirror.—A *Mirror* is made usually of glass, lined at the back with a brilliant metal, so as strongly to reflect the image of any object placed before it. When mirrors were invented is not known, but the use of a reflecting surface would become apparent to the first person who saw his own image reflected from water; and probably for ages after the civilization of man commenced, the still waters of ponds and lakes were the only mirrors; but we read in the Pentateuch of mirrors of brass being used by the Hebrews. Mirrors of bronze were in very common use among the ancient Egyptians, Greeks, and Romans; and many specimens are preserved in museums. Praxiteles taught the use of silver in the manufacture of mirrors B.C. 328. Mirrors of glass were made first at Venice A.D. 1300; and judging from those remaining—of which one may be seen at Holyrood Palace, in the apartments of Queen Mary—they were very rude contrivances, compared with modern ones. It was not until 1673 that the making of mirrors was introduced into England. It is now a very important manufacture; and mirrors can be produced of any size to which plate-glass can be cast. After the plate of glass is polished on both sides, it is laid on a perfectly level table of great strength and solidity, usually of smooth stone, made like a billiard-table with raised edges; a sheet or sheets of tinfoil sufficient to cover the upper surface of the glass are then put on and rubbed down smooth, after which the whole is covered with quicksilver, which immediately forms an amalgam with the tin. The superfluous mercury is then run off, and a woolen cloth is spread over the whole surface, and square iron weights are applied. After this pressure has been continued a day and night, the weights and the cloth are removed, and the glass is removed to another table of wood, with a movable top, which admits of gradually increasing inclination until the unamalgamated quicksilver has perfectly drained away, and only the surface of perfect amalgam remains coating the glass, and perfectly adherent to it.

Heat is reflected like light; so that a concave mirror may be used to bring rays of heat to a focus. In this way combustible substances may be set on fire at a distance from the reflector whence they receive their heat. Thus used, a mirror is called a *Burning Mirror*.

MIRROR FOR MAGISTRATES, THE: a once popular work, the first part of which was published in 1555, and the last in 1620. It probably owed its inception to George Ferrers, Master of the King's Revels, during the reign of Henry VIII. It was patterned after Lydgate's *Fall of Princes*, a version of Boccaccio's poems on the

calamities of illustrious men, which had been very popular in England. The stories are told in rhyme, each author taking the character of the 'miserable person' represented, and speaking in the first person. The first one told is that of Robert Tresilian, chief justice of England.

MIRROR WRITING: a manner of writing in which the same lines and characters are made as in normal writing, except that there is a complete reversal of right and left; the person begins at the right and proceeds toward the left, leaving a writing which is the same as normal writing seen in a mirror held at the side of the sheet, or seen from the back of the sheet by looking through it. Mirror writing is produced by the left hand when writing simultaneously with the right; also by the right hand when writing on the under side of a table or sheet of paper. Children are apt to confuse direct and mirror writing, and backward children may persist in this mode of writing.

MIRTH, n. *mėrth* [Lap. *murre,* delight: Gael. *mir,* to sport, to play; *mireag,* a sporting, frolic: perhaps connected with Eng. *merry*]: social merriment; the excitement of pleasurable feelings in company; noisy gayety. MIRTHFUL, a. *mėrth'fûl,* merry; jovial. MIRTH'FULLY, ad. *-lĭ.* MIRTH'FULNESS, n. *-nĕs,* state or quality of being mirthful. MIRTH'LESS, a. *-lĕs,* without mirth.—SYN. of 'mirth': frolic; fun; gayety; laughter; merriment; festivity; jollity; gladness; joyousness; hilarity; glee; cheerfulness.

MIRY. See under MIRE.

MIRZA, n. *mėr'zä* [Pers. *mirza,* corrupted from *Emirzadeh,* sons of the prince]: in *Persia,* when *prefixed* to the surname of a person, the common title of honor among the Persians; but when *annexed* to the surname, it designates a prince or a male of the blood-royal.

MIRZAPUR, *mėr-za-pôr':* India, a city and district of the Benares division of the United Provinces of Agra. Mirzapur, signifying the Prince's Town, the capital of the district, is on the right bank of the Ganges, 56 m. by rail s.e. of Allahabad. It presents an imposing appearance from the river, with fine ghats leading down to it, and numerous mosques, temples, and handsome European houses occupying some of the most conspicuous sites, but the interior is disappointing. It has the largest mart in Upper India for grain, cotton, and other raw produce, but with the railway era and the rise of Cawnpore to commercial importance, much of its trade has migrated elsewhere. Shellac, brassware, and carpets are manufactured. There are imports of grain, sugar, cloth, metals, fruit, spices, tobacco, lac, salt, and cotton; and exports of the same articles with manufactured lac-dye, shellac, and ghee butter. The military cantonment is 3 m. n.e. of the town, on a peninsula formed by the windings of the Ganges. Pop. (1901) 79,787.

MIS, *mĭs* [Goth. *mis*, implying error, separation: Icel. *á mis*, astray, in turns; *missa*, to lose: AS. and Icel. *mis*]: a prefix, signifying 'divergence'; error; defect; wrong. *Note.*—Skeat affirms that *mis* the prefix is sometimes used for the OF. *mes*, as in *mes-chief* = mischief, which *mes* is derived from L. *minus*, less, used as a depreciatory prefix in 'mis-alliance, mis-chance, miscreant, mis-count,' etc.

MISACCEPTATION, n. *mĭs'ăk-sĕp-tā'shŭn* [*mis*, error, and *acceptation*]: the taking in a wrong sense.

MISADVENTURE, n. *mĭs'ăd-vĕn'tūr* [*mis*, error, and *adventure:* comp. F. *mes*, prefix—from L. *minus*]: a mishap; ill luck; unlucky accident.—Syn.: misfortune; calamity; disaster; infelicity; mischance.

MISADVISED, a. *mĭs'ăd-vīzd'* [*mis*, wrong, and *advised*]: ill-advised; ill-directed.

MISALLIANCE, n. *mĭs'ăl-lī'ăns* [*mis*, wrong, and *alliance:* comp. F. *mes*, for *mis*—from L. *minus*]: a disparaging or improper connection by marriage; a marriage below one's rank; any wrong alliance; also written Mesalliance.

MISANTHROPE, n. *mĭs'ăn-thrōp* [Gr. *misanthrōpŏs*, hating mankind—from *misĕō*, I hate; *anthrōpos*, man: F. *misanthrope*]: a hater of mankind; also Misanthropist, n. *mĭs-ăn'thrō-pĭst.* Mis'anthrop'ic, a. *-thrŏp'ĭk*, or Mis'anthrop'ical, a. *-ĭ-kăl*, hating or having a dislike to mankind. Misanthropy, n. *mĭs-ăn'thrō-pĭ*, hatred or dislike to mankind—opposite of *philanthropy.*

MISAPPLY, v. *mĭs'ăp-plī'* [*mis*, wrong, and *apply*]: to apply to a wrong purpose. Mis'apply'ing, imp. Mis'applied', pp. *-plīd'.* Misapplication, n. *mĭs'ăp-plĭ-kā'shŭn*, an application to a wrong purpose.

MISAPPREHEND, v. *mĭs'ăp-prĕ-hĕnd'* [*mis*, wrong, and *apprehend*]: to take in a wrong sense; to misunderstand. Mis'apprehen'ding, imp. Mis'apprehen'ded, pp. Mis'apprehen'sion, n. *-hĕn'shŭn*, a mistake; misunderstanding; misconception.

MISAPPROPRIATE, v. *mĭs'ăp-prō'prĭ-āt* [*mis*, wrong, and *appropriate*]: to use for a purpose for which it was not designed. Mis'appro'priating, imp. Mis'appro'priated, pp. Mis'appro'pria'tion, n. *-prĭ-ā'shŭn*, wrong appropriation.

MISBECOME, v. *mĭs'bĕ-kŭm'* [*mis*, wrong, and *become*]: to suit ill; not to become. Mis'becom'ing, imp.: Adj. unseemly; improper. Mis'becom'ingly, ad. *-lĭ.*

MISBEGOTTEN, a. *mĭs'bĕ-gŏt'n* [*mis*, wrong, and *begotten*]: unlawfully begotten.

MISBEHAVE, v. *mĭs'bĕ-hāv'* [*mis*, wrong, and *behave*]: to conduct one's self improperly. Mis'behav'ing, imp. Mis'behaved', pp. *-hāvd'.* Mis'behav'ior, n. *-hāv'yẽr*, ill conduct; rude or uncivil behavior.

MISBELIEF, n. *mĭs'bĕ-lēf'* [*mis*, wrong, and *belief*]: wrong belief; false religion.

MISBELIEVE, v. *mĭs'bĕ-lēv'* [*mis*, wrong, and *believe*]: to believe erroneously. MIS'BELIEV'ING, imp. MIS'BELIEVED', pp. *-lēvd'*. MIS'BELIEV'ER, n. one who believes erroneously.

MISCALCULATE, v. *mĭs-kăl'kū-lāt* [*mis*, wrong, and *calculate*]: to calculate wrongly. MISCAL'CULATING, imp. MISCAL'CULATED, pp. MISCAL'CULA'TION, n. *-lā'-shŭn*, an erroneous calculation.

MISCALL, v. *mĭs-kawl'* [*mis*, wrong, and *call*]: to call by a wrong name; to abuse or revile. MISCALL'ING, imp. MISCALLED', pp. *-kawld':* ADJ. misnamed.

MISCARRIAGE, n. *mĭs-kăr'ĭj* [*mis*, wrong, and *carriage*]: failure; unfortunate issue of an undertaking; the expulsion of the fœtus within six weeks after conception. *Note.*—The expulsion of the fœtus between six weeks and six months is called *abortion;* and if birth occurs any time between six and nine months, it is called *premature labor* or *birth; miscarriage* and *abortion* take place without life, but in a *premature birth* there very frequently is life.

MISCARRY, v. *mĭs-kăr'ĭ* [*mis*, wrong, and *carry*]: to fail of the intended effect; not to reach its destination; to expel the fœtus within six weeks after conception. MISCAR'RYING, imp. MISCAR'RIED, pp. *-kăr'ĭd.*

MISCEGENATION, n. *mĭs'sĕ-jĕn-ā'shŭn* [L. *miscĕō*, I mix; *genĕrĕ*, to beget]: mixing of races; interbreeding of white men with women of another and lower race, or conversely. The term in the United States has application specially to amalgamation of the white and negro races, such as was fostered by the social conditions of slavery, but is said to have now almost ceased. See MIXED RACES.

MISCELLANY, n. *mĭs'sĕl-ă-nĭ* or *mĭs-sĕl'lă-nĭ* [F. *miscellanées*—from L. *miscellānĕă*, a hash of different sorts of broken meat, miscellaneous—from *miscĕō*, I mix: It. *miscellanea*]: a mass or mixture, generally; a book containing a variety of literary compositions. MIS'CELLANA'RIAN, n. *-nā'rĭ-ăn*, a writer of miscellanies: ADJ. pertaining to. MIS'CELLA'NEOUS, a. *-lā'nĭ-ŭs*, consisting of several kinds mixed. MIS'CELLA'NEOUSLY, ad. *-lĭ.* MIS'CELLA'NEOUSNESS, n. *-ŭs-nĕs*, the state of being miscellaneous. MISCEL'LANIST, n. *-lă-nĭst*, a writer in a miscellany or of miscellanies.

MISCHANCE, n. *mĭs-chăns'* [*mis*, wrong, and *chance:* OF. *meschance*, a mischief]: ill fortune; mishap.—SYN.: calamity; misfortune; disaster; misadventure; infelicity; ill luck.

MISCHIEF, n. *mĭs'chĭf* [OF. *meschef*, misfortune—from *mes*, error; *chef*, the head: Sp. *menoscabo*, loss—from *menos*, less; *cabo*, the head: L. *minus*, less; *caput*, the head]: that which turns out ill; harm; hurt; injury, whether intended or not; ill consequence. MISCHIEVOUS, a. *mĭs'chĭv-ŭs*, injurious; hurtful; producing harm or injury; prone to do mischief. MIS'CHIEVOUSLY, ad.

-ness. MIS'CHIEVOUSNESS, n. *-nĕs*, the quality of being mischievous; hurtfulness.—SYN. of 'mischief': evil; ill; damage; detriment; wrong; injustice;—of 'mischievous': pernicious; destructive; detrimental; harmful; noxious; spiteful; wicked.

MISCHNA: see MISHNA.

MISCIBLE, a. *mĭs'sĭ-bl* [F. *miscible*—from mid. L. *miscib'ĭlĭs*—from L. *miscĕō*, I mix]: in *OE.*, capable of being mixed or mingled; that may be mingled, as one liquid with another.

MISCOMPUTE, v. *mĭs'kŏm-pūt'* [*mis*, wrong, and *compute*]: to compute or reckon wrongly. MIS'COMPU'TING, imp. MIS'COMPU'TED, pp. MISCOM'PUTA'TION, n. *-tā'-shŭn*, erroneous computation.

MISCONCEIVE, v. *mĭs'kŏn-sēv'* [*mis*, wrong, and *conceive*]: to have or receive a false notion of; to interpret incorrectly. MIS'CONCEIV'ING, imp. MIS'CONCEIVED', pp. *-sēvd'*.—SYN. of 'misconceive': to mistake; misjudge; misunderstand; misapprehend.

MISCONCEPTION, n. *mĭs'kŏn-sĕp'shŭn* [*mis*, wrong, and *conception*]: wrong notion or understanding of a thing; false opinion.

MISCONDUCT, n. *mĭs-kŏn'dŭkt* [*mis*, wrong, and *conduct*]: ill behavior: V. *mĭs'kŏn-dŭkt'*, to mismanage; to conduct amiss; to misbehave. MIS'CONDUC'TING, imp. MIS'CONDUC'TED, pp.—SYN. of 'misconduct, n.': misdeed; misbehavior; delinquency; misdemeanor; mismanagement; offense.

MISCONSTRUE, v. *mĭs-kŏn'strô* [*mis*, wrong, and *construe*]: to interpret in a wrong sense either words or things. MISCON'STRUING, imp. MISCON'STRUED, pp. *-strôd*. MIS'CONSTRUC'TION, n. *-strŭk'shŭn*, wrong interpretation of words or things.

MISCOUNT, v. *mĭs-kownt'* [*mis*, wrong, and *count:* OF. *mesconter*, to miscount]: to mistake in counting. MISCOUNT'ING, imp. MISCOUNT'ED, pp.

MISCREANT, n. *mĭs'krē-ănt* [OF. *mescreant*, misbelieving, miscreant—from L. *minus credĕrĕ*, to believe amiss: F. *mécréant*, one who believes amiss, a miscreant: It. *miscredente*, an unbeliever, a miscreant]: originally, one who holds a false faith—the word which, in their detestation of the so-called heresy, the multitude applied to the early Protestants, as to the followers of Wickliffe; a vile unprincipled wretch: ADJ. unbelieving.

MISCREATE, v. *mĭs'krē-āt'* [*mis*, wrong, and *create*]: in *OE.*, to form unnaturally. MIS'CREA'TING, imp. MIS'CREA'TED, pp.

MISDATE, n. *mĭs-dāt'* [*mis*, wrong, and *date*]: wrong date: V. to date wrongly. MISDA'TING, imp. MISDA'TED, pp.

MISDEED, n. *mĭs-dēd'* [*mis*, wrong, and *deed*]: an evil deed; a wicked action.—SYN.: crime; fault; offense; transgression; trespass; misconduct; misdemeanor.

MISDEEM, v. *mĭs-dēm′* [*mis*, wrong, and *deem*]: in *OE.*, to judge ill of; to mistake. MISDEEM′ING, imp. MISDEEMED′, pp. *-dēmd′*.

MISDEMEAN, v. *mĭs′dĕ-mēn′* [*mis*, wrong, and *demean*]: to behave ill. MISDEMEANOR, n. *mĭs′dĕ-mēn′ėr*, ill behavior; evil conduct; a petty crime.—SYN. of 'misdemeanor': see under MISDEED.

MISDEMEAN′OR: lesser of two great classes into which crimes below the grade of treason are divided, Felony (q.v.) being the greater; but does not seem properly to include the numerous petty offenses which local magistrates have power to try and punish, and for which there is no specific legal designation. Misdemeanors may be either violations of the common law or offenses specifically noted by statute. To the former class belong injuries to the property of another or of the public, disturbances of the peace, cruel treatment of animals, endangering the safety of others by carelessness or violence, etc. For violations of a statute, an indictment may be secured, and the penalty is largely determined by the statute itself. In common law, offenses under the head of misdemeanors are punishable either by fine or imprisonment, or both, as the court may decide. In some states, however, there are limits to the degree of punishment which may be imposed. A M. is sometimes settled by arbitration even after it has been brought into court. But, while the court may waive criminal proceedings when a satisfactory arrangement has been made by the parties directly concerned, its consent to the compromise must be secured in order to insure its validity. The costs incurred in the case are imposed on the offender. Whenever a sentence is imposed for a M., it is at the option of the court to require bonds that the offender shall keep the peace.

MISDESERT, n. *mĭs′dĕ-zĕrt′* [*mis*, wrong, and *desert*]. in *OE.*, wrong or ill desert.

MISDIET, n. *mĭs-dī′ĕt* [*mis*, wrong, and *diet*]: in *OE.*, improper food.

MISDIRECT, v. *mĭs′dĭ-rĕkt′* [*mis*, wrong, and *direct*]: to give a wrong direction to; to direct to a wrong person or place. MIS′DIRECT′ING, imp. MIS′DIRECT′ED, pp. MIS′DIREC′TION, n. *-rĕk′shŭn*, evil direction.

MISDO, v. *mĭs-dô′* [*mis*, wrong, and *do:* Dut. *misdoen;* Ger. *missthun*, to misdo]: to do wrong; to do amiss; to commit faults. MISDO′ING, imp. doing wrong: N. an offense. MISDO′ER, n. *-ėr*, one who commits a fault or crime.

MISDOUBT, v. *mĭs-dowt′* [*mis*, wrong, and *doubt*]: to suspect, as of deceit or crime: N. suspicion, as of crime or danger. MISDOUBT′FUL, a. misgiving; full of grave doubts.

MISELTOE: see MISTLETOE.

MISEMPLOY, v. *mĭs'ĕm-ploy'* [*mis*, wrong, and *employ*]: to employ to no purpose, or to a bad purpose; to use amiss. MIS'EMPLOY'ING, imp. MIS'EMPLOYED', pp. *-ployd'*.

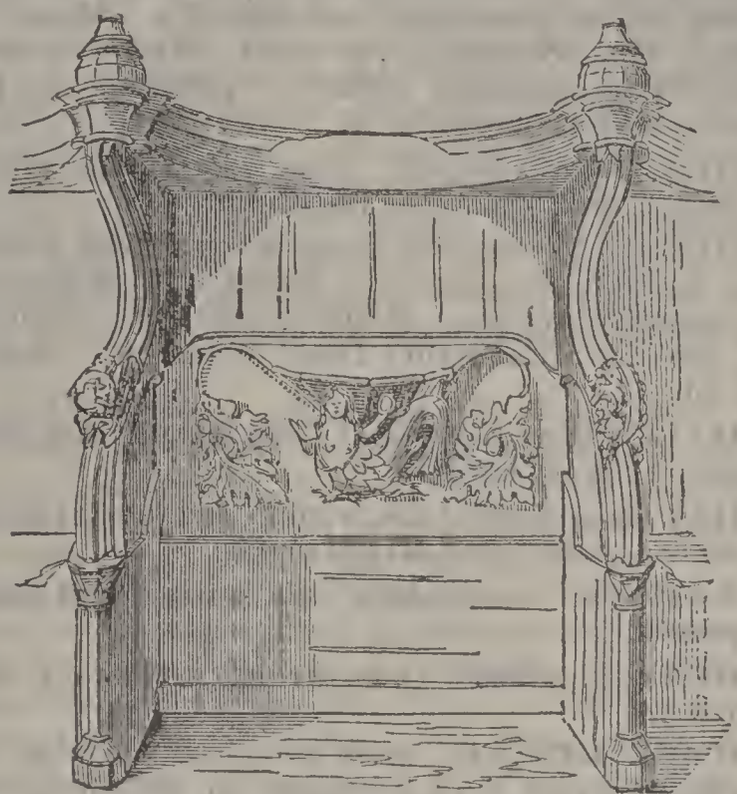
MISENO, *mē-sā'nō:* promontory of the province of Naples, 9 m. s.w. of the city of Naples. On the outskirts of the promontory are the extensive ruins of the ancient city Misenum, including a vast church and theatre. M. is much visited on account of its wonderful grotto Draconara, and a curious subterranean building or labyrinth, called the Hundred Chambers, supposed to have been anciently used as dungeons.

MISER, n. *mī'zėr* [L. *miser*, miserable: It. and Sp. *misero*, wretched, miserable]: one whose chief pleasure is the acquirement and hoarding up of money; one who, though wealthy, lives miserably through dread of poverty. MI'SERLY, a. *-lĭ*, very covetous; very mean; sordid; niggardly.—SYN. of 'miserly': stingy; mean; parsimonious; avaricious; penurious; covetous.

MISERABLE, a. *mĭz'ėr-ă-bl* [OF. *miserable*—from L. *miserābĭlĭs*, deserving of pity—from *misĕror*, I pity—from *miser*, wretched: It. *miserabile*]: very unhappy; wretched; extremely poor or mean; despicable; barren. MIS'ERABLY, ad. *-ă-blĭ*. MIS'ERABLENESS, n. *-bl-nĕs*, the state of being miserable. MISERY, *mĭz'ėr-ĭ* [F. *misère*—from L. *miser'ĭă*, misery]: extreme pain of body or mind; great unhappiness; distress; calamity; in *OE.*, covetousness; avarice.—SYN. of 'miserable': forlorn; abject; pitiable;—of 'misery': misfortune; unhappiness; wretchedness; anguish; torture; agony; torment.

MISERERE, n. *mĭz'ĕr-ē'rĕ* [L. have mercy—from *misĕrĕor*, I have mercy]: in Rom. Cath. usage, name of Ps. l. of the Vulgate (li. in authorized version), beginning in Latin with the word *Miserere*, Have mercy. It is one of the so-called 'Penitential Psalms,' and is commonly believed to have been composed by David in the depth of his remorse for the double crime which the prophet Nathan rebuked in the well-known parable (II Sam. xii.). Another opinion, however, attributes this psalm to Manasses, or to some of the psalm-writers of the captivity. The M. is of frequent occurrence in the services of the Roman Church; and in the celebrated service of Tenebræ, as performed in the Sixtine Chapel at Rome, it forms, as chanted by the pope's choir, one of the most striking and impressive chants in the entire range of sacred music. It is sung on each of the three nights in Holy Week (q.v.) on which the office of Tenebræ is held, with different music on each of the three occasions, the three composers being Bai, Baini, and the still more celebrated Allegri.—M. is the name also of one of the evening services in Lent, which is so called from the singing of that psalm; which service includes a sermon, commonly on the duty of sorrow for sin.—MIS'ERERE is the name also of a projection on the under side of the seats of the stalls of mediæval churches and chapels.

etc.; usually ornamented with carved work, and so shaped that, when the seat-proper is folded up, it forms a small seat at a higher level, sufficient to afford some



Miserere:
From Billings's *Carlisle Cathedral.*

support to a person resting upon it. Aged and infirm ecclesiastics were allowed to use these during long services.

MISERY: see under MISERABLE.

MISFEASANCE, n. *mĭs-fā′zăns* [OF. *mes*, wrong; *faisance*, manner, method: F. *faisances*, manorial services]: a trespass; a wrong done; the improper doing of an act which a person might lawfully do. M. in law is the doing of a positive wrong, in distinction from nonfeasance, which means a mere omission. Acts are sometimes followed with different legal consequences, according as they fall under the head of misfeasance or nonfeasance.

MISFEIGN, v. *mĭs-fān′* [*mis*, wrong, and *feign*]: in *OE.*, to feign with an ill design.

MISFIT, n. *mĭs-fĭt′* [*mis*, wrong, and *fit*]: a bad fit.

MISFORM, v. *mĭs-fawrm′* [*mis*, wrong, and *form*]: to make of an ill form. MISFORMING, imp. *mĭs-fawr′mĭng*. MISFORMED′, pp. *-fawrmd′*.

MISFORTUNE, n. *mĭs-fŏr′tūn* or *-chûn* [*mis*, wrong, and *fortune*]: ill fortune; adversity; mishap; disaster; calamity.—SYN.: mischance; misadventure; ill; harm.

MISGIVE, v. *mĭs-gĭv′* [*mis*, wrong, and *give*]: to fill with doubt; to deprive of confidence; to fail, applied to the heart, as, my heart *misgave* me. MISGIV′ING, imp.: N. a failing of confidence; doubt; mistrust. MISGAVE′, pt. *-gāv′*. MISGIV′EN, pp. *-gĭv′n*.

MISGOTTEN, a. *mĭs-gŏt'n* [*mis*, wrong, and *gotten*]: in *OE.*, unjustly obtained.

MISGOVERN, v. *mĭs-gŭv'ėrn* [*mis*, wrong, and *govern*]: to govern ill; to administer unfaithfully. MISGOV'ERNING, imp. MISGOV'ERNED, pp. *-ėrnd.* MISGOV'ERNMENT, n. *-mĕnt*, ill management either of public or of private affairs; disorder; irregularity.

MISGRAFF, v. *mĭs-grăf'* [*mis*, wrong, and *graff*]: in *OE.*, to graff on a wrong or improper stock.

MISGUIDE, v. *mĭs-gīd'* [*mis*, wrong, and *guide*]: to lead or guide into error; to direct ill. MISGUID'ING, imp. MISGUID'ED, pp. MISGUID'ANCE, n. *-gīd'ăns*, the act of leading into error; false direction. MISGUID'INGLY, ad. *-lĭ.*

MISHANDLE, v. *mĭs-hănd'l* [*mis*, wrong, and *handle*]: to bungle; to treat badly.

MISHAP, n. *mĭs-hăp'* [*mis*, wrong, and *hap*]: ill chance; an accident.—SYN.: see MISFORTUNE.

MISHAPPEN, v. *mĭs-hăp'n* [*mis*, wrong, and *happen*]: to happen ill.

MISHEAR, v. *mĭs-hēr'* [*mis*, wrong, and *hear*]: to hear imperfectly.

MISHMEE BITTER, *mĭsh'mē bĭt'ėr:* root of *Coptis Teeta* (see COPTIS), a plant found in the mountainous regions on the borders of India and China; of the same genus with the Golden Thread of the northern parts of the world, and not unlike it. The root is in much use and esteem in parts of the east as a stomachic and tonic, and has begun to be known in Europe.—The root also of *C. trifoliata* is used as a bitter.

MISHNA, n., or MISCHNA, *mĭsh'nă* [Heb. *mishnah*, repetition, explanation—from *shanah*, to repeat, also to learn]: great collection of decisions by the ancient Rabbis on the Hebrew law, including traditions of the Jews and interpretations of passages of Scripture; forming, with the *Gemara*, the text of the Talmud. MISH'NIC, a. *-nĭk*, pertaining to or relating to the Mishna.—*Mishna* comprises the body of the 'Oral Law,' or the juridico-political, civil, and religious code of the Jews; and forms, as such, a kind of complement to the Mosaic or Written Law, which it explains, amplifies, and immutably fixes. It was not, however, the sole authority of the schools and the masters on which these explanations and the new ordinances to which they gave rise depended, but rather certain distinct and well-authenticated traditions, traced to Mount Sinai itself. No less were certain special letters and signs in the Written Law appealed to in some cases, as containing an indication to the special, newly issued, or fixed prohibitions or rules: see HALACHA. The M. (to which the Toseftas and Boraithas form supplements) was finally redacted, after some earlier incomplete collections, by Jehudah Hanassi, A.D. 220 at Tiberias. It is written mostly in pure Hebrew, and is divided into six portions (Sedarim): 1.

Zeraim (Seeds), on Agriculture 2. Moed (Feast), on the Sabbath, Festivals, and Fasts; 3. Nashim (Women), on Marriage, Divorce, etc. (embracing also the laws on the Nazirship and Vows); 4. Nezikin (Damages), chiefly civil and penal law (also containing the ethical treatise Aboth); 5. Kodashim (Sacred Things), Sacrifices, etc.; description of the Temple of Jerusalem, etc.; 6. Tehoroth (Purifications), on pure and impure things and persons. Of translations of the Mishna may be mentioned that of Surenhusius in Latin (1698-1703); that of Rabe in German (1760-3); that of Hoffman and Baneth in German (1900); that of Castiglione in Italian (1904). A vast Mishna literature exists in German and Hebrew. See TALMUD.

MISILME'RI (corrupted from *Menzil-al-Amir,* Village of the Emirs): town of the island of Sicily, province of Palermo, 7 m. s.e. of Palermo city. It is a straggling, poverty-stricken town. It was at Misilmeri that Garibaldi, 1860, May, joined the Sicilian insurgents; and it was by a short cut from Misilmeri to Palermo, through the pass of Mezzagna, that he advanced on Palermo and took it by a *coup-de-main.* Misilmeri was formerly a notorious harbor of banditti. Pop. 10,500.

MISIMPROVE, v. *mĭs'ĭm-prôv'* [*mis,* wrong, and *improve*]: to abuse; to improve to a bad purpose. MIS'IMPROV'ING, imp. MIS'IMPROVED', pp. *-prôvd'.* MIS'IMPROVE'MENT, n. *-prôv'mĕnt,* ill use or employment.

MISINFORM, v. *mĭs'ĭn-fawrm'* [*mis,* wrong, and *inform*]: to give wrong information to. MIS'INFOR'MING, imp. *-fawr'mĭng.* MIS'INFORMED', pp. *-fawrmd'.*

MISINTEND, v. *mĭs'ĭn-tĕnd'* [*mis,* wrong, and *intend*]: in *OE.,* to misdirect; to aim badly. MISINTEND'ED, a. ill-directed.

MISINTERPRET, v. *mĭs'ĭn-tẽr'prĕt* [*mis,* wrong, and *interpret*]: to understand or explain in a wrong sense; to form false opinions or notions. MIS'INTER'PRETING, imp. MIS'INTER'PRETED, pp. MIS'INTER'PRETER, n. one who interprets wrongly. MIS'INTER'PRETA'TION, n. *-shŭn,* a mistaken or false interpretation.

MISJOINDER: in law, a term used in equity pleading to denote the improper union of causes of action in a single suit at law.

MISJUDGE, v. *mĭs-jŭj'* [*mis,* wrong, and *judge*]: to judge erroneously; to form false opinions or notions of; to mistake. MISJUDG'ING, imp. MISJUDGED, pp. *-jŭjd'.* MISJUDG'MENT, n. *-mĕnt,* an unjust judgment or determination.

MISLAY, v. *mĭs-lā'* [*mis,* wrong, and *lay*]: to put aside and not afterward to recollect where; to lose; to lay in a wrong place, or out of its proper place. MISLAY'ING, imp. *-lā'ĭng.* MISLAID', pt. and pp. *-lād'.*

MISLE, v. *mĭz′l* [from *mist* (see MIZZLE)]: to rain in very fine drops like a thick mist. MIS′LING, imp. MISLED, pp. *mĭz′ld.*

MISLEAD, v. *mĭs-lēd′* [*mis*, wrong, and *lead*]: to lead astray or into error; to deceive; to delude; to beguile. MISLEAD′ING, imp.: N. act of one who misleads. MISLED′, pt. and pp. *-lĕd′*. MISLEAD′ER, n. *-ėr*, one who leads to ill.

MISLEARNED, a. *mĭs-lėrn′ĕd* [*mis*, wrong, and *learned*]: not accurately or properly learned.

MISLED, pt. and pp. of MISLEAD, which see.

MIS′LETOE: see MISTLETOE.

MISLIKE, v. *mĭs-līk′* [*mis*, wrong, and *like:* AS. *mislícan*, to displease]: to dislike.

MISLIN, or MISLEN: see MASLIN.

MISLIVE, v. *mĭs-lĭv′* [*mis*, wrong, and *live*]: in *OE.*, to live ill.

MISMANAGE, v. *mĭs-măn′āj* [*mis*, wrong, and *manage*]: to manage or conduct ill, as any matter of business. MISMAN′AGING, imp. MISMAN′AGED, pp. *-ājd.* MISMAN′AGEMENT, n. *-āj-mĕnt*, improper or wrong management of any matter or affair.

MISNAME, v. *mĭs-nām′* [*mis*, wrong, and *name*]: to call by the wrong name. MISNA′MING, imp. MISNAMED′, pp. *-nāmd′*.

MISNIA, or MEISSEN: see MEISSEN.

MISNOMER, n. *mĭs-nō′mėr* [OF. *mes*, badly, for L. *minus*, less, and F. *nommer*, to name: *mis* for *mes*, wrong, and L. *nominārĕ*, to name]: a wrong name; a misnaming. In *law*, the giving of a wrong name to a party in a suit. Formerly, the objection of M. was of some importance, but now is of none, as it is easily cured by amendment.

MISNUMBER, v. *mĭs-nŭm′bėr* [*mis*, wrong, and *number*]: to count or reckon wrongly.

MISOGAMIST, n. *mĭs-ŏg′ă-mĭst* [Gr. *misĕō*, I hate; *gamos*, marriage]: a hater of marriage. MISOG′AMY, n. *-ă-mĭ*, hatred or aversion to marriage.

MISOGYNY, n. *mĭs-ŏj′-ĭ-nĭ* [Gr. *misĕō*, I hate; *gŭnē*, a woman]: hatred or aversion to women. MISOG′YNIST, n. *-ĭ-nĭst*, a woman-hater.

MISORDER, v. *mĭs-ŏr′dėr* [*mis*, wrong, and *order*]: in *OE.*, to conduct ill; to manage irregularly.

MISPICKEL, n. *mĭs′pĭk-l* [said to be from O. Ger. *mispückel*]: arsenical pyrites, an arsenide with sulphide of iron, of a tin-white color and strong metallic lustre; composition 33·54 per cent. iron, 33·42 arsenic, 21·08 sulphur; hardness 5·5 to 6; specific gravity 6 to 6·4; found mostly in crystalline rocks, and used in making white arsenic.

MISPLACE, v. *mĭs-plās′* [*mis*, wrong, and *place*]: to put in a wrong place; to set or place on an improper object, as confidence or affections. MISPLA′CING, imp. MISPLACED′, pp. *-plāst′*. MISPLACE′MENT, n. *-plās′mĕnt*, the state of being misplaced; the act of putting in a wrong place.

MISPRINT, v. *mĭs-prĭnt′* [*mis*, wrong, and *print*]: to mistake in printing; to print wrong: N. *mĭs′prĭnt*, a mistake in printing. MISPRINT′ING, imp. MISPRINT′ED, pp.

MISPRISE, or MISPRIZE, v. *mĭs-prīz′* [OF. *mespriser*, to disesteem, to contemn—from OF. *mes*, badly—from L. *minus*, less, and mid. L. *pretĭārĕ*, to prize, to esteem—from L. *pretĭŭm*, a price]: in *OE.*, to slight; to undervalue; to scorn; to despise; to mistake. MISPRIS′ING, imp. MISPRISED′, pp. *-prīzd′*.

MISPRISION, n. *mĭs-prĭzh′ŭn* [OF. *mespris*, a neglect or contempt; *mesprison*, error, offense—from *mesprendre*, to mistake, to transgress—from OF. *mes*, badly—from L. *minus*, less, and mid. L. *prensĭōnem* for *prehensĭōnem*, a seizing]: in *law*, a term applied to all such high offenses as are under the degree of capital, but nearly bordering thereon: neglect, negligence, or contempt; mistake. *Note.*—MISPRISION was confused with MISPRISE in the sense of 'contempt,' from OF. *mespris*, 'contempt,' and thus '*misprision* of treason' was defined to be 'neglect or light account made of treason'; and again, '*misprision* of clerks' was 'neglect of clerks in keeping the state records' or records of courts of law—see Skeat.

MISPRIZE: see MISPRISE.

MISPRONOUNCE, v. *mĭs′prō-nowns′* [*mis*, wrong, and *pronounce*]: to speak incorrectly; to pronounce wrongly. MIS′PRONOUN′CING, imp. MIS′PRONOUNCED′, pp. *-nownst′*. MIS′PRONUN′CIA′TION, n. *-nŭn′sĭ-ā′shŭn*, wrong or improper pronunciation.

MISPROUD, a. *mĭs-prowd′* [*mis*, wrong, and *proud*]: in *OE.*, viciously proud.

MISQUOTE, v. *mĭs-kwōt′* [*mis*, wrong, and *quote*]: to cite or quote incorrectly. MISQUO′TING, imp. MISQUO′TED, pp. MIS′QUOTA′TION, n. *-kwō-tā′shŭn*, the act of quoting wrongly; the wrong quotation itself.

MISRATE, v. *mĭs-rāt′* [*mis*, wrong, and *rate*]: to reckon or estimate incorrectly. MISRA′TING, imp. MISRA′TED, pp.

MISRECKON, v. *mĭs-rĕk′n* [*mis*, wrong, and *reckon*]: to compute incorrectly. MISRECK′ONING, imp. MISRECK′ONED, pp. *-rĕk′nd*.

MISREPORT, v. *mĭs′rĕ-pōrt′* [*mis*, wrong, and *report*]: to give an incorrect account of; to make a wrong report: N. a false or incorrect account of. MIS′REPORT′ING, imp. MIS′REPORT′ED, pp.

MISREPRESENT, v. *mĭs-rĕp′rĕ-zĕnt′* [*mis*, wrong, and *represent*]: to represent falsely or incorrectly. MISREP′RESENT′ING, imp. MISREP′RESENT′ED, pp. MISREP′RESENTA′TION, n. *-zĕn-tā′shŭn*, a false or incorrect account given from mistake, carelessness, or malice; a softened expression for a lie or falsehood.

MISREPRESENTA′TION, in a legal view, or as usually termed, fraudulent M., is that kind of lie for which courts of law will give redress. It consists in a wilful falsehood as to some material thing connected or not with some contract; the object being that the party deceived should act upon it as true. The legal result is, that if the party so relying on its truth and acting on it suffer damage, he can sue the deceiver for such damage. It has sometimes been supposed that the deceit or misrepresentation must have reference to some contract, or arise out of some confidential relation between the parties, and that the party making it should have some private interest to serve; but this is a mistake; and recent cases have established, that if a person wilfully—i.e., either not knowing anything at all one way or the other about the matter, or knowing the facts, misrepresent something, with the intention that a stranger should act on such misrepresentation, and such stranger does so act on it, and suffer damage, then the right of action accrues to the deceived party. One remarkable exception to this doctrine, however, occurs in the case of the contract of marriage, where either party has in general no remedy whatever against the other for misrepresentations as to his or her property, connections, etc.; though there may be legal redress for an injured party in the case of a deceiver who by M. has prevented ascertainment of lack of chastity on the part of an intended wife, or of severe chronic disease in the case of either party to an intended marriage. It is not necessary that M. should be in writing to give ground for action, except in cases where the party gives representations as to the conduct, credit, ability, trade, or dealings of a third party, in order that such third party shall obtain credit, money, or goods, thereby. The doctrine of M. has acquired consequence of late, by the extension of the system of joint-stock companies, and the practice of the directors and officers publishing, or being parties to, fraudulent reports, accounts, and circulars as to the credit and stability of such undertakings. It is now settled, that not only every director, but every clerk in the service of the directors, who knowingly and wilfully concurs and takes a part in publishing or circulating such false reports, whereby strangers are led to believe and act on them, and thereby suffer pecuniary loss, is liable to an action of damages at the suit of such strangers. It is also a general rule affecting contracts (other than marriage), that M. in some material point bearing on the contract, and likely to induce the party to enter into such contract, will render the contract void; but in order to make M. of a minor sort have the same effect, the party

must warrant it as true; in which case, whether important or not, or whether wilful or not, a M. avoids the contract: this applies generally in contracts of life and fire insurance. Another important class of fraudulent misrepresentations, now brought within the criminal law to a large extent, is that of counterfeiting trade-marks: see TRADE-MARKS.

MISREPUTED, a. pp. *mĭs'rĕ-pū'tĕd* [*mis*, wrong, and *reputed*]: wrongly reputed.

MISRULE, v. *mĭs-rôl'* [*mis*, wrong, and *rule*]: to rule wrongly or badly: N. unjust rule; disorder; confusion. MISRU'LING, imp. MISRULED', pp. *-rôld'*. LORD OF MISRULE, the one who presided over Christmas sports.

MISS, n. *mĭs* [from *mistress*, arising from a contracted way of writing it]: a title of address conferred on young unmarried women, prefixed to the name, as *Miss* Brown or *Miss* Jane Brown: a young girl: a kept mistress. MISSES, n. plu. *mĭs'sĕz*. MISSY, n. *mĭs'sĭ*, a little miss. *Note.*—MISSES is (according to authorities generally) the plural of the noun MISS; in such an expression as *Miss Brown*, however, it is claimed by some that the word Miss is undoubtedly adjectival, and that the true plural form is therefore *Miss Browns*—on the ground that the expression *Misses Brown* is not only phonetically disagreeable, but also grammatically an adjectival character is assigned to *Brown*, the really significant name.

MISS, v. *mĭs* [Icel. *missa*, to lose: Dut. *missen*, to fail, to miss: Dan. *misse*, to wink or blink]: to fail in hitting or reaching, as a mark; to fail in obtaining, finding, or keeping; to discover something to be wanting; to perceive the want of; to mistake; to omit; to be wanting: N. loss; want; mistake. MISS'ING, imp.: ADJ. lost; wanting; absent: N. the act of failing to hit the mark; in *OE.*, disappearance; loss. MISSED, pp. *mĭst*.

MIS'SA DI VO'CÉ: in *singing*, the gradual swelling and again diminishing of the sound of the voice on a note of long duration.

MISSAL, n. *mĭs'săl* [F. *Missel*—from mid. L. *missālĕ*, Mass-book—from *missa*, the Mass, which see]: Roman Cath. ritual or Mass-book, the volume containing the offices used in celebration of the Mass. In the early western church, the Mass-book was called *Sacramentarium*, containing only a part of the present M. The volumes containing all the parts of service in high mass and low mass were called *Plenars*. Anciently, considerable variety in minor details prevailed among the books in use in different countries, and even in different churches of the same country. With the view of uniformity, the pope, in virtue of a decree of the Council of Trent, 1570, ordered that all churches which had not, for a clearly ascertained period of 200 years, had in uninterrupted use a peculiar service-book of their own, should thenceforth adopt the Roman M. Of this exemption, several churches in Germany, France, and even

in Italy, availed themselves; but in later times, the great majority have conformed to the Roman use. The Roman M. has twice since that date been subjected to revision and correction—1604 by Clement VIII., and 1634 by Urban VIII. The latter recension continues in use. The missals of the oriental rites differ from that of the Roman Church, each having for the most part its own proper form. See LITURGY.

MISSEEM, v. *mĭs-sēm′* [*mis*, wrong, and *seem*]: in *OE.*, to make a false appearance; to misbecome. MISSEEM′-ING, imp. misbecoming: N. a false appearance; disguise. MISSEEMED′, pp. *-sēmd′*.

MISSEL, n. *mĭs′sĕl:* a bird of the thrush kind—so called from feeding on the berries of the *mistletoe;* also called MISTLE-THRUSH.

MISSELTOE: see MISTLETOE.

MISSEND, v. *mĭs-sĕnd′* [*mis*, wrong, and *send*]: to send amiss or incorrectly. MISSENT′, pp. a. sent to the wrong or improper address.

MISSHAPE, v. *mĭs-shāp′* [*mis*, wrong, and *shape:* O. Dut. *misscheppen*, to misshape]: to give an ill form to; to shape ill. MISSHAPING, imp. MISSHAPED′, pp. *-shāpt′*. MISSHA′PEN, a. *-shā′pn*, ill-formed; ugly; deformed.

MISSILE, n. *mĭs′ĭl* [L. *missĭlĕ*, a missile—from *missĭlis*, that is thrown or cast—from *missus*, sent or thrown]: a weapon or thing thrown, or intended to be thrown, to hurt or injure, as a lance, a spear, a bullet, a stone. ADJ. that may be thrown or sent, as missile weapons.

MISSINNIP′PI RIVER: see CHURCHILL RIVER.

MISSION, n. *mĭsh′ŭn* [F. *mission*—from L. *missĭōnem*, a sending off—from *missus*, sent: It. *missione*]: state of being sent by authority on some special business; persons sent on some special business or with some particular object in view; purpose of life; message; a station of missionaries in a heathen country. In Rom. Cath. and other prelatical churches, a course of special Christian services held in a town or parish for a limited time, under the direction of the priest, but usually with the assistance of some one who has a gift for such services. It corresponds to the 'revival' in non-prelatical denominations. The themes are solemn; the preaching is pungent, earnest, practical, and awakening, presenting the fundamental truths of faith and repentance. A M. is held usually in Lent or in Advent. The prayers are sometimes extemporaneous, and the singing is generally congregational. In the Church of England, the M. has for years been largely developed and productive of great good: it has been introduced of late with wide acceptance in the Prot. Episc. Church in the United States. *Mission* in *OE.* is a discharge; a faction or party. MISSIONARY, a. *mish′-ŭn-ā-rĭ* [F. *missionnaire*]: pertaining to missions: N. one sent to preach the gospel to the heathen or the poor; one laboring to spread the gospel, especially among a

neglected population, in connection with some church or society. MISSIONER, n. *mĭsh′ŭn-ẽr*, for 'missionary,' in prelatical churches, a special preacher who conducts missions—analogous to a revivalist or 'evangelist.' MIS′SIONARY-REC′TOR, n. the title given to certain Roman priests in each diocese in England, from their having charge of missions more than ordinarily important.—SYN. of 'mission': errand; deputation; commission; delegation; embassy.

MIS′SIONARY RIDGE, BATTLE OF: see CHATTANOOGA, BATTLE OF.

MIS′SIONS, CHRISTIAN: enterprises of the Church of Christ for the conversion of the nations to Christianity, by sending to them preachers and teachers called *missionaries*.

The first Christians used great zeal in preaching the gospel to the heathen; Christian teachers continued to go forth for this purpose into heathen countries until about the 9th c.; and though other and less worthy means were too often employed, the labors of Palladius in Ireland, of Columba in Scotland, of Augustine in England, of Gallus and Emmeran in Alemannia, of Kilian in Bavaria, of Millibrod in Franconia, of Swidvirt in Friesland, of Siegfried in Sweden, of Boniface in Thuringia and Saxony, of Adalbert in Prussia, of Cyril and Methodius among the Slavonians, and of many such early missionaries, were unquestionably very instrumental in the extension of Christianity in Europe. After the Reformation, the Rom. Cath. Church, roused to activity by its losses and dangers, not only sent forth missionaries to confirm its adherents in Protestant countries, and to win back Protestants, but also sought to repair its losses by new acquisitions from the vast domain of heathenism. With this view, the *Congregatio de Propagandâ Fide* was constituted by Gregory XV. 1622, and the *Collegium de Propagandâ Fide* (see PROPAGANDA) by Urban VIII. 1627; and a number of institutions, called *seminaries*, were established for training missionaries. Jesuit missionaries earnestly prosecuted their work among the Indians of S. America, from the middle of the 16th c. to the middle of the 18th, when they were expelled by the Portuguese and Spanish governments, because their political power had become too formidable. They are accused of administering baptism to pagans with too great readiness; but they were certainly successful in extending civilization among the Indians, particularly of Paraguay. Jesuit missions to India and Japan were founded hy Francis Xavier (q.v.) in the middle of the 16th c. In Japan, the missionaries made great progress at first; and in 1582 they boasted of 150,000 converts, 200 churches, and 59 religious houses of their order in that empire; but ere the middle of the 17th c., the whole work had been overthrown by severe and bloody persecution, and every missionary expelled. In China, similar

success was gained, followed by a period of persecution though the destruction effected was less complete than in Japan. The Rom. Cath. Church continued to exist in China, its missionaries and members enduring great hardships, and many of them evincing their sincerity even by their death. Christianity was finally forbidden and Christians sent into exile (1724) so that there were few converts in China at the opening of the 19th c. With the gradual opening of the Empire the propaganda was renewed so that there are not a few Rom. Cath. in China at the present day. In Abyssinia also, the Jesuits made much progress in the 17th c., and for a time attained great power in the country; but their interference in political matters led to their complete expulsion. In the 17th c., the Jesuits boasted of the vast success of their mission in Madura, a province of s. India; but it was found to be rather apparent than real, and to have been attained by a compromise of Christianity and the employment of unworthy means, so that, after long contests in the papal court, a decision was pronounced against the Jesuits, and their connection with Madura was dissolved in the middle of the 18th c. Rom. Cath. missions have from the first done much for the Indian tribes of N. America—especially on the Pacific coast, and in the more northern central and Atlantic regions. At the present day this work is not relaxed in vigor nor diminished in success.

For a long period after the Reformation, the Prot. Church seems to have been little sensible of the duty of laboring for the propagation of Christianity; nor was it until the 19th c. that missionary zeal began to be largely developed. In the middle of the 17th c. (1647), indeed, an act of the English parliament (the 'Long Parliament') established the *Society for Propagating the Gospel in Foreign Parts;* and in 1698 was established the *Society for Promoting Christian Knowledge.* A few missionaries from the early New England churches labored with zeal and success among the N. American Indians, in which field the names of Eliot and Mayhew are particularly distinguished in the 17th c., and that of Brainerd in the 18th; but the commencement of more systematic and continuous Prot. missionary enterprise may be reckoned from the establishment of the first Prot. mission to India, which did not take place till the beginning of the 18th c., when Bartholomew Ziegenbalg and another were sent thither by Frederick IV. of Denmark, and settled in a small territory, then belonging to Denmark, on the coast of Coromandel. The mission in s. India soon received the support of the English *Society for Promoting Christian Knowledge*, and was maintained and extended chiefly by that soc. during the whole of the 18th c. Among the missionaries in this field, the name of Schwartz is particularly distinguished; and his success, and the influence which he acquired in the country, were equally remarkable. He died in 1798. Since that time, the missionary work in s. India has been carried on with continued success by

numerous societies, European and American. Greater progress has been made there than in any other part of India: indeed, the work was not commenced in any other part till almost a century later.—The Moravian Church early entered on missionary enterprise, and was the first Prot. church which did so in its united or corporate character; and very successful missions of the United Brethren (Unites Fatrum) were planted in the 18th c. at the Cape of Good Hope, in the W. Indies, and in Labrador. Greenland had previously been the field of similar enterprise by missionaries from Norway. The mission to Greenland was founded by Hans Egede (q.v.) 1721, and has been maintained to the present day with such success that the greater portion of the Greenlanders have now been converted to Christianity, and much of the rudeness of their former life has disappeared.—Toward the close of the 18th c., some of the great missionary societies still existing in England were formed—the *Baptist Missionary Soc.* 1792, *London Missionary Soc.* 1795. About the same time, the *British and Foreign Bible Soc.* and the *Religious Tract Soc.* were formed, which have coöperated with all the missionary societies as most important auxiliaries. The *Baptist Missionary Soc.*, immediately after its formation, sent missionaries to n. India: Dr. Carey was one of its first, and also one of its most eminent (see CAREY, WILLIAM). India is now a field of labor for many missionary societies, not only of Britain, but also of the United States and of the continent of Europe. The *London Missionary Soc.* was at first composed of members from almost all Prot. denominations; but the formation of other societies, and the engagement of churches as such in more denominational missionary enterprise—e.g., the Wesleyan Meth. Church, the Presb. Church—have left this soc. now almost entirely to the English Congregationalists, who administer it in a liberal spirit and with much energy. It sent its first missionaries to the South Sea Islands, and the mission was maintained for about 16 years, amid many difficulties, without any apparent success; but its success was afterward great and rapid, first in Tahiti, later in other islands, so that now many islands of the South Seas are entirely Christian. The London Missionary Soc. soon entered other fields of labor, and now maintains missions to many parts of the world. In Madagascar amazing success has attended its work. One of the most important societies founded during the 19th c., the *Church Missionary Soc.*, formed by members of the Church of England, has sent forth missionaries to many fields. They have been particularly successful in New Zealand, Africa, and about Hudson's Bay; and they recently entered the Egyptian Sudan. The various churches in Scotland also support vigorous mission agencies. The late Dr. Livingstone, of the London Missionary Soc., explored vast regions in central Africa. Fired by his example, the friends of missions in Scotland subscribed £12,000 to found *Living-*

stonia, a memorial mission station on Lake Nyassa, under the management of the Free Church Foreign Missions Committee; and an expedition arrived there and established itself 1876. Various other missionary societies, Rom. Cath. and Prot., have selected stations in the region of the great lakes. The Wesleyan Methodists have missions in many parts of the world. They have been particularly successful in the Fiji Islands and in parts of w. Africa.

In the United States, the missionary societies rival those of Britain in magnitude and importance.—The *American Board of Commissioners for Foreign Missions* was formed by the Gen. Assoc. (Congl.) of Mass., at Bradford, 1810, the oldest soc. (for general misions) in the United States. It was formed by Congregationalists, but with a view to uniting the Presb. denominatons also in the great work—thus not on a denominational basis. The Reformed (Dutch) Church withdrew, to prosecute its missions as a separate organization, 1838; and the Presb. constituency of the Amer. Board likewise withdrew 1870—leaving the soc., like the London Miss. Soc., practically Congl., though holding unchanged its original undenominational basis. The Presb. Synod of Pittsburg formed a foreign missionary society in 1831 and sent workers to Africa and India but in 1870 all the work was united under the care of the General Assembly. One of the early enterprises of the Amer. Board was the mission to the Sandwich Islands, founded 1819, which has resulted in the general Christianization of these islands, and in their civilization to a degree which, considering the shortness of the time, is a notable achievement. The mission stations of the Amer. Board are in all parts of the world: specially notable has been their more than half-a-century of work in India. Their missions for many years in Turkey, and recently in Japan, have had great fruitfulness in gathering Christian converts and churches and are recognized by statesmen as of immense social, economical, and political importance, through their gift to the people of new ideals of human character and life.—The *American Baptist Missionary Society* has occupied Burmah and Farther India as one of its principal spheres of labor, and there its missionaries have had probably the most remarkable success recorded in missionary annals, in the Christianization and civilization of the people called Karens, and, within a few years, of other Indian peoples. The missionaries of the Prot. Episc. Church have brought great blessings to many of the Indian tribes in the far western States of America. The Miss. Soc. of the Meth. Epis. Church was formed in 1819. It has now flourishing work in India, China, Africa and other fields.

On the continent of Europe, the first Prot. missionary Soc. was that of Basel 1816; the next was that of Berlin 1823; and some of these have also maintained successful missions in heathen countries.—The most marked and

extensive success of missions, besides those above noticed, is in Madagascar where missionaries of the London Missionary Soc. early had the protection and favor of King Radama I., and the church planted by them continued to exist, notwithstanding most bloody persecution, and the martyrdom of tens of thousands of its members, during the next reign under a heathen queen. It is a wonderfully flourishing church at the present day, although the occupation of the island by France has hindered Protestant work and most of it has been transferred to the care of the Paris Missionary Society. The queen and her councilors became Christians and there are to-day immense Prot. churches at the capital city. In s. Africa, also, important results have been attained. Access has recently been obtained to China, and a number of Prot. churches and societies have entered energetically upon that field. Preparation had been previously made for this, by missionary labors among the Chinese in the Malay-Peninsula, and by the study of the language, the compilation of grammars and dictionaries, and the translation of the Bible into the Chinese language. Indeed, it must be reckoned as among the services rendered to mankind by Christian missionaries, in modern times, that they have not only translated the Bible and other religious books into many languages, but have reduced many barbarous tongues to writing, and have prepared grammars and dictionaries, thereby contributing not a little, independently of their highest aim, to the promotion of knowledge, civilization, and the welfare of the human race.—One of the important features of recent years in missionary work, is the formation, rapid growth, and large results of *Women's Missionary Societies:* these, not excluding the general work, devote their efforts mainly to reaching—with uplifting power—the benighted and wretched women of heathen lands. This work is one of great significance.

The progress of Christian missions to Mohammedan countries has hitherto been very small, though numerous converts from Mohammedanism, as well as from heathenism, have been made in India. Of late, some have thought they observed a movement among the Mohammedans of India, apparently tending toward Christianity; but at the same time there has been a new awakening of Mohammedanism itself in the Eastern Peninsula and the islands of the Malayan Archipelago. Missions to the Jews have for several years engaged not a little of the attention of some portions of the Christian Church, particularly in England and Scotland.

Christian missions have passed through the era of experiment, and are rapidly emerging from the cloud of suspicion or contempt which at first was cast about them. It is evident that if the rate of advance in the last decade, in three or four important national mission-fields, be continued, the decades will not be very many before Christ will have been preached in all the world.

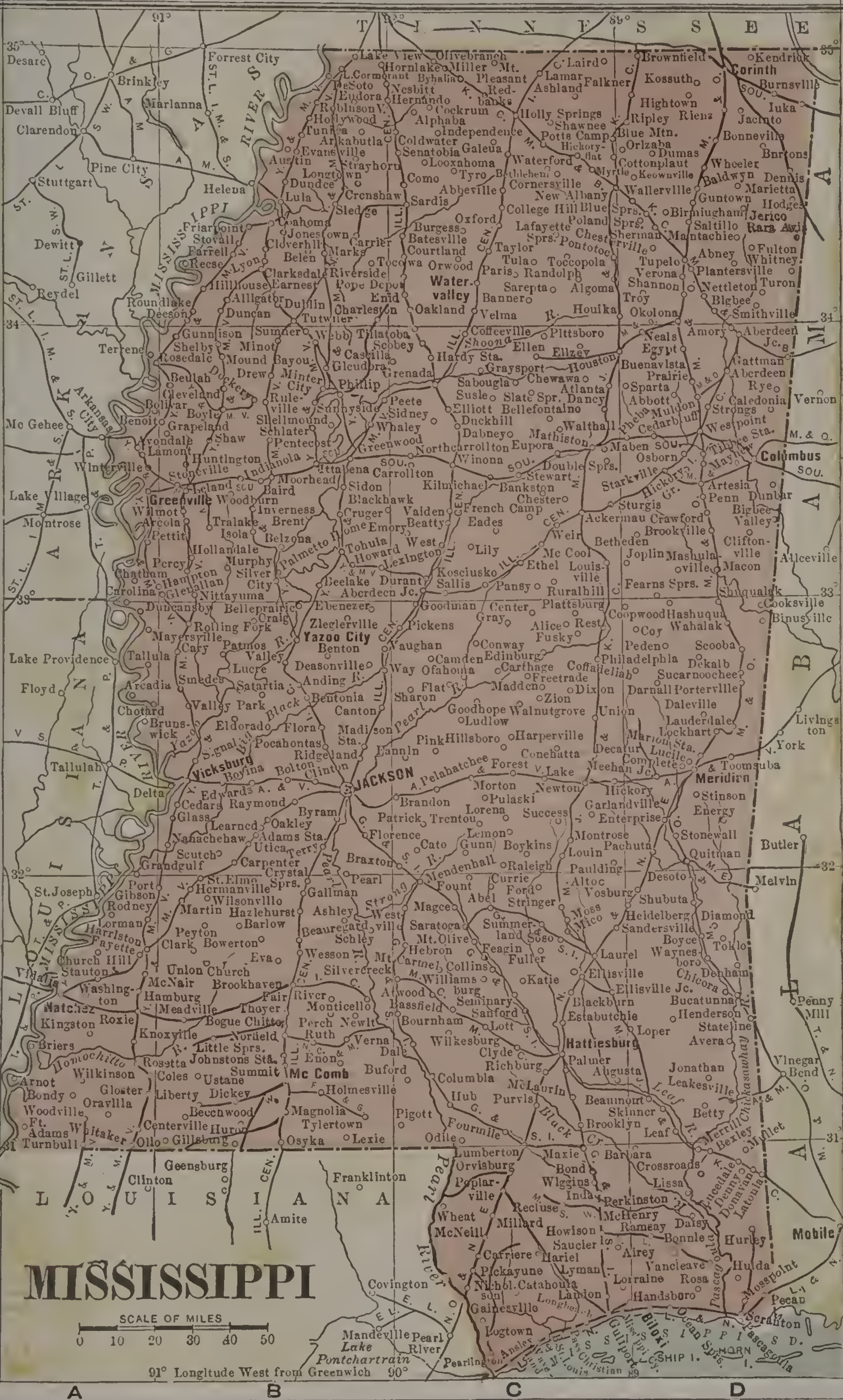
MISSISSIPPI, *mĭs-ĭs-sĭp'ĭ:* a state; one of the United States of America; 7th in order of admission into the Union; 18th in population 1880, 21st in 1890, and 20th in 1900; in 1902, 3d in production of cotton (1,451,626 bales) and 20th in corn. Popularly known as the 'Bayou State.' The name is Indian, meaning 'Father of Waters.'

Location and Area.—Mississippi is in lat. 30° 13′—35° n., long. 88° 7′—91° 41′ w.; bounded n. by Tennessee, e. by Alabama, s. by the Gulf of Mexico and Louisiana, w. by Louisiana and Arkansas; extreme length n. and s. 332 m., extreme breadth 189 m., mean breadth 142 m.; 46,810 sq.m. (29,958,400 acres); total gulf-coast 287 m.; greatest elevation 800 ft.; cap. Jackson.

Topography.—The surface is generally undulating, with numerous hills and a broad, low ridge extending n. and s. through the state, the whole face sloping gradually toward the Mississippi river and the Gulf of Mexico from the rugged limestone region in the n.e. East of the central ridge are broad tracts of fertile prairie, which yield large crops of corn and cotton, and w. are a number of valleys between low ridges that extend from the central ridge to the great Mississippi 'bottom,' or Yazoo basin, an elliptical area extending from Vicksburg n. to Tennessee, and embracing on the e. the valley of the Yazoo and Tallahatchee rivers. It is more than 50 m. wide in the centre, comprises about 4,000,000 acres, is swampy and frequently inundated, and is the centre of the cotton-zone of the state. 'Cane hills' or 'bluffs' occupy the country along the Mississippi river below Vicksburg, for 10 or 15 m., some of which are 150 ft. above the river; and a broad belt of timber-land with extremely fertile tracts extends along the river below the Yazoo delta, but, like the 'bottom,' is subject to overflow. Extensive marshes prevail at the mouths of the streams entering the gulf. The Mississippi river forms the western boundary for more than 500 m. by its windings, and the Tennessee river the northeastern boundary for 15 m. The main drainage is by the Mississippi river and its affluents, the Homochitto, Bayou Pierre, Big Black, and Yazoo rivers; the Sunflower, which connects the Mississippi with the Yazoo; the Tallahatchee and Yalabusha, which form the Yazoo; the Pearl and Pascagoula, with their branches, the Bogue Chitto, Leaf, and Chickasawha, which enter the gulf; and the Tombigbee, with its numerous affluents in the e. The Yazoo is navigable throughout, and its affluents for considerable distances; the Big Black is navigable by steamers for 50 m. above its mouth; the Pearl may be ascended by small boats for 100 m. from its mouth; and the part of the Tombigbee in Mississippi is navigable for 10 m. Large sums have been expended by the federal and state governments in building levees along the Mississippi river to prevent overflows; yet spite of annual

Area in Square Miles, 46,810. Population, 1,551,270.

Number of Counties, 77. Capital of State, Jackson.



strengthenings, breaks frequently occur leading to disastrous overflows, as in 1890, Mar. and Apr.

Climate.—The summers are long and hot; winters short, and colder than on the Atlantic coast in the same latitude; most temperate and agreeable climate from Oct. to July. Excepting the lowlands of the water-courses and the malarial 'bottom,' the state is generally healthful, with temperature at Vicksburg 47°—56° in winter and 80°—83° in summer, and rainfall at Natchez 54 in., along the coast 64 in., and average for the state 57¾ in. The rainfall is quite equably distributed through the year, insuring a marked uniformity in amount of agricultural products.

Geology.—The limestone formation of s.w. Tennessee extends a considerable distance in the n.e. corner of Mississippi, cropping out in massive walls on both sides the Tennessee river. This is succeeded, on the w., first by the cretaceous, then by the tertiary formations, the latter comprising 7 groups: the n. lignite, siliceous Claiborne, calcareous Claiborne, Jackson, Vicksburg, Grand Gulf, and coast Pleiocene. The quaternary or alluvial predominates in the 'bottom,' the lowlands of the Mississippi, Sunflower, and Yazoo rivers and their tributaries, and for a distance of 30 m. back from the gulf-coast. The orange sand, a notable feature of the geology of Mississippi, is found in various shades in different localities, and in some places is sufficient in mass and solidity to furnish substantial building-stone. The economic provisions are chiefly brown coal, mineral fertilizers, potters' and firebrick clay, and rotten limestone for burning. The mineral deposits are of slight consideration, though there are numerous medicinal springs of alkaline and saline chalybeates, containing iron, lime, magnesia, and some soda.

Zoology.—Wild animals are plentiful in the wooded districts, and include bears, foxes, wolves, wild cats, panthers, deer, and various small game—e.g., rabbits, squirrels, gophers, and wood-rats. Teal, brant, wild pigeons, wild turkeys, quail, mocking-birds, and rice-birds abound. The swamps and bottom-lands abound in lizards, water-snakes, rattle-snakes, and moccasins; and the bayous of the Mississippi river in alligators. The principal streams contain abundance of fish—e.g., giant cat-fish, buffalo-fish, black bass, pickerel, and many others common to n. waters; and oysters and other shell-fish are taken in large quantities from Mississippi Sound.

Agriculture.—There are about 250,000 farms in M., comprising over 20,000,000 acres, about half of which is improved land. The total value of all farm property, including lands, buildings, and improvements, implements and machinery, and live stock is nearly $225,000,000. The principal crops are corn, oats, potatoes, hay, tobacco, rice, and cotton. Wheat, peas, beans, peanuts, onions, and garden truck are also grown to

some extent, while apples, peaches, plums, prunes, and pears are plentiful. The wool production of the state is also valuable.

Manufactures.—There are about 1,750 manufacturing establishments, the annual aggregate production of which is worth approximately $65,000,000. Lumber and timber products form the principal industry, followed by cotton-seed oil and coke, other valuable products being cotton goods, turpentine and rosin, lumber, planing-mill products, and oyster canning and preserving. Greenville has the greatest number of manufacturing establishments.

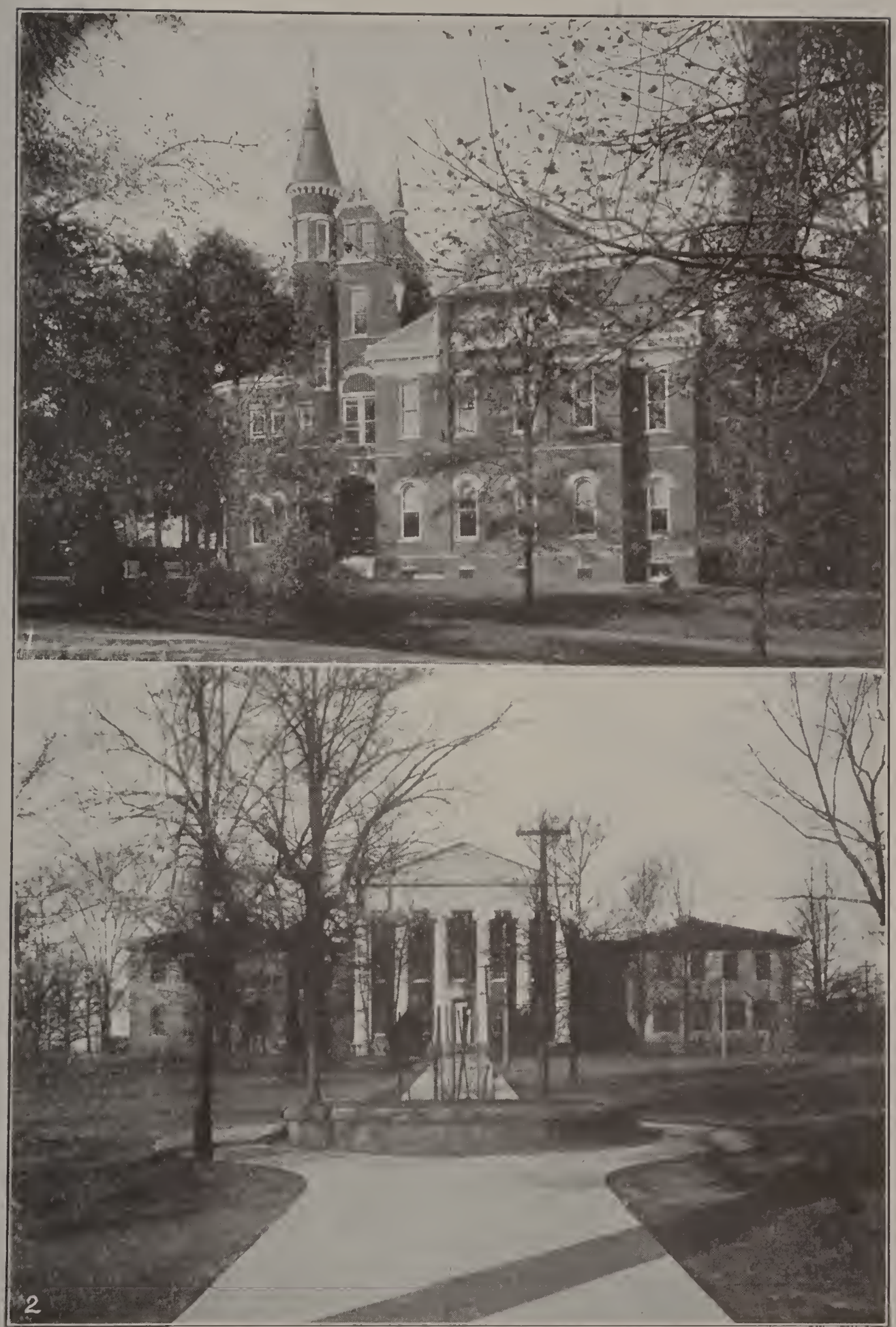
Commerce and Transportation.—M. has but one port of entry, Pearl River, the annual imports averaging about $65,000 and the exports about $6,500. M. and Louisiana comprise one internal revenue district. Several railroads run through the State, many of them important ones, their aggregate mileage being about 4,200 miles. There are also about 10 street railway lines operating approximately 75 miles.

Finance and Banking.—The total assessed valuation of property, including both personal and realty, amounts to $393,297,173, the tax rate is $6 per $1,000, and the bonded debt $3,589,226. There are about 30 national banks, and nearly 300 State banks. There are 12 savings banks.

Education.—The state spends considerably more than $2,500,000 a year in the maintenance of its public schools, in which there are nearly 500,000 pupils enrolled, with about 9,500 teachers. There are also co-educational colleges and universities and colleges and universities for both men and women exclusively, schools of technology, law, and medicine, and both public and private normal schools, besides many private secondary schools. The principal institutions for the higher education of men are the two State Agricultural and Mechanical Colleges and the University of M. The institutions for the higher education of women include Blue Mountain Female College, Whitworth Female College, Hillman College, Industrial Institute and College of Columbus, Central M. Institute, Belhaven College, Meridian Female College, Stanton College, Chickasaw Female College, and Port Gibson Female College. Some of these are sectarian institutions.

Religion.—The Baptist Church is easily the strongest denomination in the state, claiming approximately one-half of the entire church-going population. Other sects well represented are the Methodist Episcopal, South; African Methodist; Methodist Episcopal; Roman Catholic; Presbyterian, South; Cumberland Presbyterian; Disciples of Christ; and Protestant Episcopal.

Charities and Corrections.—These include a state penitentiary at Jackson, where the prisoners are employed at farm labor; state hospitals for the insane at



1. Library, University of Mississippi.
2. Lyceum Building, University of Mississippi.

Jackson and Meridian; State hospitals at Vicksburg and Natchez; and the State Deaf and Dumb Institute for white and colored and the school for the blind (white), both at Jackson. Besides these, there are also private charities.

History.—Hernando De Soto (q.v.) and his Spanish companions are believed to have been the first European visitors to the region of the present state of Mississippi. They traversed the old Chickasaw country 1539, spent a year or more in the present Yazoo 'bottom,' reached the Mississippi river 1541, and separated on their leader's death 1542, without having made any settlements. In 1673, Jacques Marquette (q.v.) and Louis Joliet (q.v.), attempting to reach the mouth of the Mississippi river, made several temporary landings within the present limits of Mississippi; and 1682 Robert La Salle (q.v.) and the Chevalier de Tonti (q.v.) spent some time among the Natchez Indians while on La Salle's second expedition to the Mississippi mouth. Sixteen years after La Salle had taken possession of the region in the name of France, and called it Louisiana in honor of the king, Pierre le Moyne, Sieur d'Iberville (q.v.), received royal permission to attempt to colonize the new territory. With 200 French immigrants he entered Mobile Bay 1699, Jan. 1, discovered Pascagoula river, landed on Ship Island, and built a fort at the Bay of Biloxi, 80 m. e. of the site of New Orleans. Iberville ascended the Mississippi river as far as Natchez, returned to France, collected a second and larger colony, secured a military force, and built a fort and established a colony at Natchez (Fort Rosalie) 1716. The Biloxi settlement was soon abandoned, but the establishment of colonies at New Orleans, Haynes Bluff, the Bay of St. Louis, Pascagoula, and other points, attracted many immigrants and adventurers to the region. In 1718, all the colonies became subject to the company formed by John Law (q.v.) to carry out his great 'Mississippi Scheme'; and when that enterprise failed, the whole territory of Louisiana passed to the control of the Company of the Indies. Under this management, efforts were made to concentrate the strength of the French settlers in New Orleans, and, while that settlement began to attain importance, the smaller ones in Mississippi suffered from lack of attention and protection. In 1728, the new French government fomented trouble with the Choctaw and Natchez Indians, who hitherto had been friendly with the whites, and they and several smaller tribes united to drive the French from the entire territory. Fort Rosalie was attacked 1729, Nov. 29, and the other settlements in Mississippi about the same time; but the successes of the Indians were checked by a military force sent from New Orleans 1730. In 1733, the Company of the Indies surrendered its interests and control in the region to the French king, and when Gov. Bienville was reinstated he found the colonists involved in a bitter war

with the Chickasaw Indians, who as friends of the English had hated the French from their arrival. This war lasted several years, comparative peace prevailed 1743-52, and further trouble with the Indians broke out 1752. The part of Louisiana including what is now Mississippi was ceded by France to Great Britain 1763, and for several years the principal settlers were the English from the Atlantic coast colonies. The U. S. government, having succeeded to the rights of the English in the region, formed the territory of Mississippi 1798, Apr. 7. It was then bounded n. by a line drawn e. from the mouth of the Yazoo river to the Chattahoochee, e. by the Chattahoochee, s. by the 31st parallel, w. by the Mississippi river. 1804, Mar. 27, a portion of the region ceded to the government by Georgia was added, making the territory comprise the present states of Alabama and Mississippi n. of the 31st parallel; and the part s. of that parallel, between the Pearl and Perdido rivers, was incorporated 1812, May 14. In 1817, Mar., Alabama was separated from Mississippi territory, and, in Dec. following, Mississippi was admitted into the Union as a state. The first constitution was in force till 1832, when a second was adopted. On the election of Pres. Lincoln 1860, a state convention was called, which adopted an ordinance of secession 1861, Jan. 9, and ratified the constitution of the Confederacy Mar. 30, without submitting the question to popular vote. The state promptly furnished its quota of troops for the Confederate army, and during the civil war suffered severely, particularly in the n. counties. Biloxi was captured by federal troops and a battery was removed from Ship Island 1861, Dec. 31; the battle of Shiloh was fought near the Mississippi border, after which the Confederates retired to Corinth, which was captured by the federal troops 1862, May 30; a battle was fought near Iuka Sep. 19; the Confederates attacked Corinth, but were repulsed Oct. 3, 4; Vicksburg was captured by the Union army, after important military operations and a remarkable siege, 1863, July 4; the capital was captured by the Union army; and, among others, two raids were made on Meridian. After the close of the war, the state authorities undertook to reorganize the state government, but Pres. Johnson appointed William L. Sharkey provisional governor, and he called a convention, which amended the state constitution by abolishing slavery 1865, Aug. 21, and repealed the ordinance of secession the following day. State officers, congressmen, and a legislature were elected Oct. 2, and U. S. senators on the meeting of the legislature; but neither senators nor congressmen were admitted to their seats. During the reconstruction period, the state was under the military command of Gens. E. O. C. Ord, A. C. Gillem, Irvin McDowell, and Adelbert Ames. It was readmitted to the Union 1870, Feb. 23, and the state authorities assumed control Mar. 10, following.

MISSISSIPPI.

Government.—The executive authority is vested by the constitution of 1890 in a governor elected for 4 years; the legislative in a general assembly, comprising a senate of 45 members, and a house of representatives of 145 members; salary of each $400 per annum, biennial sessions; and the judicial in a supreme court, comprising a chief-justice and 2 associate justices appointed by the governor for 9 years; a circuit court in each of the judicial districts, each with a single judge appointed for 6 years; a chancery court in each chancery district, each with a chancellor appointed for 4 years, and justices of the peace elected for 2 years. There are also lieutenant-governor, secretary of state, treasurer, auditor, attorney-general, superintendent public education, commissioner of agriculture, land commissioner, adjutant-general, and librarian. By the constitution, treason, murder, and arson committed in the night are punished with death; married women may convey and devise property belonging to them at the time of marriage or acquired subsequently, are not liable for debts of their husbands, and may do business as if unmarried; the state cannot become a stockholder in any corporation or association, nor pledge nor lend its credit to any corporation, association, or individual; no one who denies the existence of a Supreme Being, or who is not a qualified elector, can hold office; and the chief grounds of divorce are adultery, sentence to penitentiary, desertion for two years, habitual drunkenness, and cruel treatment.

The successive governors, with their terms of service, are as follows: *Territory*—Winthrop Sargent 1798-1802; William C. C. Claiborne 1802-05; Robert Williams 1805-09; David Holmes 1809-17. *State*—David Holmes 1817-19; George Poindexter 1819-21; Walter Leake 1821-25; David Holmes 1825-27; Gerard C. Brandon 1827-31; Abraham M. Scott 1831-33; Hiram G. Runnels 1833-35; Charles Lynch 1835-37; Alexander G. McNutt 1837-41; Tilghman H. Tucker 1841-43; Albert G. Brown 1843-48; Joseph W. Matthews 1848-50; John A. Quitman 1850-1; John J. Guion (acting) 1851; James Whitfield 1851-2; Henry S. Foote 1852-54; John J. MacRae 1854-58; William McWillie 1858-60; John J. Pettus 1860-62; Jacob Thompson 1862-64; Charles Clarke 1864-5; W. L. Sharkey (provisional) 1865-6; Benjamin G. Humphreys 1866-70; James L. Alcorn 1870-1; Ridgley C. Powers 1871-74; Adelbert Ames 1874-76; John M. Stone 1876-82; Robert Lowry 1882-90; John M. Stone 1890-96; A. J. McLaurin, 1896-1900; A. H. Longino 1900-04; J. K. Vardaman 1904-8; E. F. Noel 1908-.

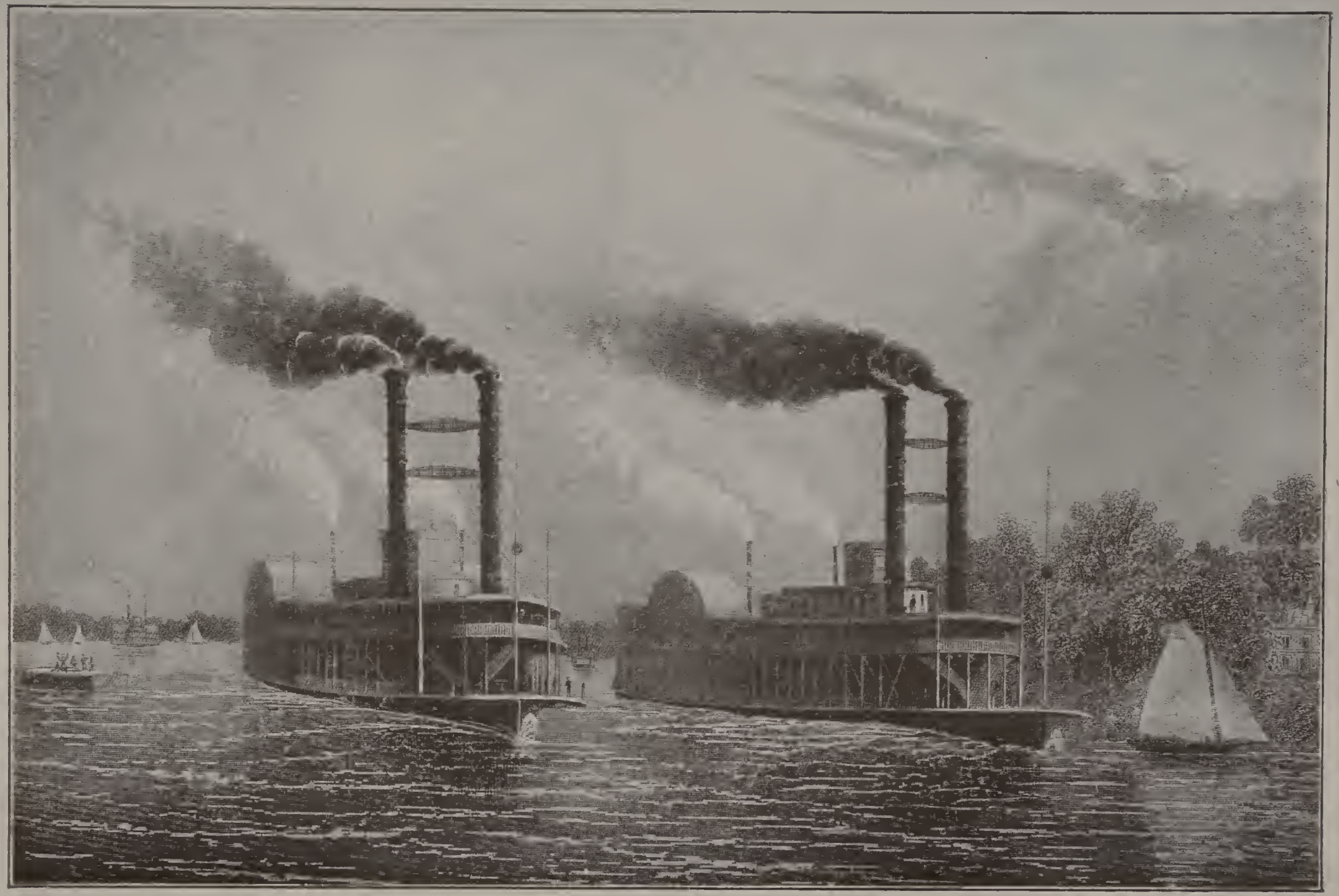
Politics.—State, congressional, and presidential elections are held Tuesday after first Monday in Nov. Idiots, insane, and criminals are excluded from voting. The state government is wholly democratic as to state officers and nearly so as to the legislature. Mississippi has 10 electoral votes. Her votes for president and vice-president have been as follows: 1820, James Monroe and

Daniel D. Tompkins, 2 each, 1 vacant; 1824, Andrew Jackson and John C. Calhoun, 3; 1828, Andrew Jackson and John C. Calhoun; 1832, Andrew Jackson and Martin Van Buren, 4; 1836, Martin Van Buren and Richard M. Johnson; 1840, William Henry Harrison and John Tyler; 1844, James K. Polk and George M. Dallas, 6; 1848, Lewis Cass and William O. Butler; 1852, Franklin Pierce and William R. King, 7; 1856, James Buchanan and John C. Breckinridge; 1860, John C. Breckinridge and Joseph Lane; 1864, no vote; 1868, no vote; 1872, U. S. Grant and Henry Wilson, 8; 1876, Samuel J. Tilden and Thomas A. Hendricks; 1880, Winfield S. Hancock and William H. English; 1884, Grover Cleveland and Thomas A. Hendricks, 9; 1888, Grover Cleveland and Allen G. Thurman, 9; 1892, Grover Cleveland and Adlai E. Stevenson, 9; 1896, William J. Bryan and Arthur Sewall, 9; 1900, William J. Bryan and Adlai E. Stevenson, 9; 1904, Alton B. Parker and Henry G. Davis, 10.

Population.—(1800) white 5,179, free colored 182, slave 3,489, total 8,850; (1810) white 23,024, free colored 240, slave 17,088, total 40,352; (1820) white 42,176, free colored 458, slave 32,814, total 75,448; (1830) white 70,443, free colored 519, slave 65,659, total 136,621; (1840) white 179,074, free colored 1,366, slave 195,211, total 375,651; (1850) white 295,718, free colored 930, slave 309,878, total 606,526; (1860) white 353,899, free colored 773, slave 436,631, total 791,305; (1870) white 382,896, free colored 444,201, total 827,922; (1880) 1,131,597; (1890) 1,289,000; (1900) 1,551,270; (1910) 1,797,114.

Bibliography.—Claiborne, *Mississippi as a Province, Territory and State* (1889); Davis, *Recollections of Mississippi* (1889); Duval, *History of Mississippi* (1892); Garner, *Reconstruction in Mississippi* (1901); Goodspeed, *Memoirs of Mississippi* (1891); Hurt, *Mississippi: Its Climate, Soil and Production* (1883); Hilgard, *Report on the Geology and Agriculture of Mississippi* (1860); Lowry and McCarsle, *History of Mississippi* (1891); Monette, *History of the Mississippi Valley* (1848); Mayes, *Educational History of Mississippi* (1891); Rozier, *History of Early Settlements in the Mississippi Valley* (1890); Tracy, *Mississippi As It Is* (1895); Wall, *The State of Mississippi* (1879); Winsor, *The Mississippi Basin* (1895).

MISSISSIPPI AGRICULTURAL AND MECHANICAL COLLEGE: founded in 1880, at Agricultural College, Miss. The courses offered are the agricultural, engineering, textile and pedagogical, leading to the degree of B.S. and M.SC. There are a preparatory department and a summer school. Women are admitted to all courses. The experiment station is connected with the college, and receives special Federal appropriation. The college was endowed by the Federal land grants of 1862 and 1890, and receives also state and Federal appropriations. The total number of students in 1907 was 1,378; the faculty numbered 56.



ON THE MISSISSIPPI.

MISSISSIP'PI RIVER: chief river of N. Amer. and greatest artery of internal commerce in the world, involving a system of 35 rivers, to which it is the trunk, and 15,000 m. of inland navigation, with the drainage of a vast breadth of the United States, 1,147,000 sq. m., between the Alleghany and Rocky Mts. The chief upper branches of the system are the Missouri river on the n.w., with drainage area of 518,000 sq. m.; the Ohio on the n.e., with drainage area of 214,000 sq. m.; and the upper M., with drainage area of 169,000 sq. m. The respective lengths of these three are—Missouri 2,908 m.; Ohio 1,265 m.; upper M. 1,330 m. (above the mouth of the Missouri). It thus appears that the upper M. is hardly more of a stream than the Ohio, and that it and the Ohio together do not nearly equal the Missouri. The turbid water of the trunk stream, moreover, from its mouth n. for 1,286 m., is found to be continuous with the water of the Missouri, and not with the clear water of the upper M. The true river, in fact, which opens a water-course n. 2,200 m., to the falls of St. Anthony, and into the n.w. 3,860 m., to the Great Falls of the Missouri, would be properly known as the Missouri, if volume, length, and the character of the stream dictated the name. The fact of continuity of direction with the trunk stream, from the Gulf n., has caused the upper M. to be viewed as the extension of the trunk, and entitled to give its name to the whole stream.

The earliest European discovery of the M. was by De Soto, 1541, June, not far from the site of Helena, Ark. Marquette and Joliet descended the Wisconsin river to the M., which they entered 1673, June 17, and sailed down nearly to the Gulf. La Salle entered it from the Illinois river 1682, and descended to the Gulf. He set up a column there, with the Fr. arms, 1682, April 9, and claimed possession, for the Fr. king, of the vast territory reached by the great river and its branches. The highest source of the upper M. was fixed by Schoolcraft's explorations, 1832, in Lake Itasca (q.v.), from which the river issues in a stream 10 or 12 ft. wide and 18 in. deep. Later explorations carried the highest point two m. or more beyond, or s. of, Itasca, and Capt. Willard Glazier, 1881, July 22, reached a higher smaller head-water which he named Lake Glazier (q.v.), from which a stream flows n. a mile or two into Itasca. Explorers since, however, have asserted that Capt. Glazier mistook the long-known Elk Lake for a new discovery. He estimated this to be 1,582 ft. above sea-level, and 5,184 m. from the mouth of the M. Col. H. L. Abbot's estimate of the distance between the mouth and source of the M. is 2,616 m: the elevation of the source he puts at 1,680 ft. Hopewell Clarke, long a land-explorer for the N Pacific R.R. Co., was chief of an exploring expedition to discover the sources of the M. 1886. Its results are given in *Science*, VIII. (1886, Dec. 26). They show that Nicollet's creek is far the largest affluent of Itasca, contributing about three-fourths of the regular perennial inflow: it is

also the longest—its windings being taken into account; it is also the most elevated—having been traced beyond what Nicollet saw of it, to a little lake 92 ft. above the level of Lake Itasca: thus, as Nicollet says—'This creek is truly the infant Mississippi.' Its head is in a narrow lake about half-a-mile long, whose head is in the n.w. of quarter-section 34, tp. range 143. Out of this lake the stream flows northward, 18 inches wide, 12 inches deep. The locality is in that part of Minn., Becker co., lat. 47° 10′ n., long. 95° 2′ w., which is very near the centre of the continent, and where the three greatest river systems of N. Amer. originate: that of the Red river of the north, that of the great lakes and the St. Lawrence, and that of the M. At the extreme head-waters of the Missouri, the M., and the Ohio, water falling on a single sq. m. may take opposite courses to the sea. The course of the M. from Itasca is e. of n., but, as it proceeds, a circuit is entered upon, going generally e., but with large bends and a very devious stream, through Bemidji, Cass, and Winibigoshish lakes, which are the most n. head-waters of the great river; thence s.e., past the falls of Pokegama, to a point where Swan river enters, 998 m. above the mouth of the Missouri; thence s. for some distance, to a point opposite to the w. end of Lake Superior; and thence s.w., to a bend back toward the e., where the circuit ends, and from which the river begins the long stretch, generally s.e., from abt. 130 m. above St. Paul to a turn s.w., at a point half-way between Dubuque and Rock Island, and w. of Chicago, distant 138 m. Just at the end of its great circuit, and at the head of its long s.e. stretch, the river receives a branch almost as large as itself, the Crow Wing river, which brings in from the n.w. a drainage corresponding to that gathered by the M. from the n.e. and n. The M. is wholly within Minn. for 663 m., and is its w. boundary for 134 m. further. Of this 797 m., navigation extends 540, with the break at the falls of St. Anthony. These falls have a single descent of 18 ft. only, over a sandstone cliff; but with rapids both above and below, the descent is 65 ft. within three-quarters of a mile. A line of steamers above the falls runs to St. Cloud, 86 m., and very much further when high water favors. Below the falls, navigation is regular through 2,200 m. to the Gulf. The Rock Island rapids, 14 m. in length, next above the cities of Rock Island and Davenport, and the Des Moines rapids, 130 m. lower down and 12 m. long, have required elaborate improvement to secure good navigation. For the season of low water, the entire upper M. is, in fact, difficult for boats, on account of the frequent sand-bars. The upper M. is joined by the larger and turbid Missouri, 1,286 m. above the Gulf of Mexico, 189 m. above Cairo, at the mouth of the Ohio, and 16 m. above St. Louis. It proceeds abt. 159 m. further, to the head of the broad alluvial basin which extends thence to the Gulf, and which greatly alters the character of the stream. This basin of broad bottom-lands has an average width of 50 or 60 m., and a length of 500 m. The

great river winds back and forth across it so much as to have a channel length of 1,097 m. The head of the basin is 30 m. above Cairo; and the gateway by which the river enters the basin is a gap of 8 or 10 m. in length, through a spur of the Ozark range of mts. This spur lies across s. Ill., and across the courses of the two great rivers which meet at Cairo, the M. and the Ohio. In a remote geological age, before the great bottom-lands had been made by the deposit of alluvium, an arm of the sea reached from the present Gulf of Mexico to the head of the present alluvial basin, and at that time the waters of immensely greater streams than the M. and the Ohio, poured over the Ozark barrier in cataracts vastly greater than anything now known. The channel by which the M. now flows through the Ozark Mts. has a rocky descending bed, cut by the stream, and forming the last of the rapids in the M. There are alluvial bottom-lands above the Ozark limit of the great basin of the lower M. They extend as far as 40 or 50 m. above the mouth of the Missouri river, with a width of 6 to 40 m. The Amer. bottom, on the Ill. side, extends down from the mouth of the Missouri for nearly 100 m., with an average breadth of 6 m. Below the mouth of the Ohio, the bottom-lands arelow and liable to very wide overflow in flood seasons. The channel of the river is cut through them by the stream itself, in a very winding and changing course. On the w. of the channel, the bottoms, with a single exception at Helena, Ark., are continuous for 500 m., and 50 or 60 m. wide, the greater part of the area being still unreclaimed swamp of extremely rich soil. The Arkansas and the Red rivers are very large tributaries on that side. On the e. side the bluff formation which bounds the alluvial bottoms is occasionally reached by the river channel, which then has a shore from 100 to 300 ft. above the stream, as at Columbus in Ky., Randolph and Memphis in Tenn., Vicksburg, Grand Gulf, and Natchez in Miss., and Baton Rouge in La. With the few exceptions named, a belt of alluvial bottom extends from Cairo to Memphis, and a little lower down begins the great Yazoo basin or Mississippi bottom, an elliptical area of rich lowlands, 360 m. long, to near Vicksburg, and midway of its length 60 m. wide. The cut of the channel is that of a trough, which grows narrower and deeper as we descend the stream. At St. Philip, 37 m. from its mouth, the width is 2,470 ft.; at Carrollton, 84 m. higher up, and on for 123 m. to Baton Rouge, it is 3,000 ft.; for the next 400 m. up the river the width is 4,080; and thence to Cairo, 450 m., it is 4,470 ft. In the upper stream, beyond the Ozark, the width at various points is: below the mouth of the Missouri 3,800 ft.; at the falls of St. Anthony, 1,200 ft.; at Cass Lake 172 ft.; at Bemidji Lake, its most n.w. headwater, 120 ft. The depth at the falls of St. Anthony is 30 to 40 ft.; at the mouth of the Missouri 80 ft.; at the mouth of the Ohio 87 ft.; from the mouth of the Arkansas to the mouth of the Red river 96 ft.; and below Red river 121 ft. The average depth is augmented by floods, 37 ft.

at St. Louis; 51 ft. at Cairo; 47 at Columbus; 40 at Memphis; 51 at Natchez; 31 at Baton Rouge; 14½ at Carrollton, near New Orleans; 4½ at St. Philip; and less than 2½ at the head of the Passes into the Gulf. A variation from the average width takes place commonly in the large bends, which may become 1 m. or more wide, and there are long reaches of the river where extreme width gives shallow water, shoals, and bars, and bad navigation. A large number of islands occur in the stream, and these are known by numbers, from 1 to about 100. The lower end of the alluvial plain of the M. is a large delta protruded far into the Gulf of Mexico, through which the river finds several channels or Passes to the Gulf, the principal and most direct, the S. Pass, being 17 m. long. It is here especially, and for some distance up the stream, that bars most seriously obstruct navigation. The extent and peculiarity of the windings of the channel, from Cairo to the head of the delta, constantly bending back and forth, and making long loops where it goes round 25 or 30 m. only to return almost to the same point, could have been made only by a rapid and powerful current, irresistibly digging its way along the lines of lowest level and least resistance. With such a current carrying a vast amount of sediment, the channel may anywhere fill up sufficiently to turn the digging power into one or the other bank, or through the neck formed by a large loop, and at once a new course is swiftly made. When loops are cut off, their inlet and outlet are soon banked across by the sediment thrown down at the edges of the stream, thus leaving the cut-off bend of the old channel in the form of a crescent lake, great numbers of which occur on the w. side of the present channel. At the mouths of streams entering the channel of the lower M., drift materials are often thrown into a compact mass miles in length, across and on either side of the tributary mouth, making a bridge on which soil will gather and trees grow, as in the nearly contiguous examples at the mouth of the Red river and the passage from the M. to the Atchafalaya. The last was removed in 1835, after it had been growing for 60 years, and had become 10 m. long, 600 ft. wide, 8 ft. deep, and solid enough to have trees growing on it 60 ft. high. The Red river-raft had become 45 m. long, before it was successfully attacked, 1872, and broken through by some years of costly labor. The waters of the M. are pure and clear to the mouth of the Missouri, where they become whitish muddy. The Ohio adds a greenish tint, and the Arkansas and Red rivers that of their red ochreous sediment. Soil, sand, and gravel from the constantly falling banks, are carried along by the current, and thrown down in the bends and eddies of the stream, in many cases forming obstructive bars, while great trees torn from their place on the banks are left in mid-channel, their roots planted on the bottom and their tops pointed directly in the way of steamers ascending the river. Only by continual care are these dangerous snags kept out of the way of navigation. The

ancient normal working of the river built up its banks on either side above the level of the alluvial plain, and the forest or sod growth gave these banks comparative permanence, such as even the modern levees do not secure, unless made as nearly as possible like the natural. The earliest artificial levee, a m. in length, was made at New Orleans, 1717, by the engineer De la Tour, to protect the infant settlement. 20 m. below and 30 m. above were settled by 1770, and by 1828 the levees were continuous nearly to the mouth of Red river. In 1850–1 congress made grants of land to the states interested, and provided for a ten-years' survey, which resulted, 1861, in the *Report upon the Physics and Hydraulics of the Mississippi River*, by A. A. Humphreys and H. L. Abbot, on the basis of which all subsequent efforts of improvement have been made. This report established the fact that the digging power of the current at flood could be depended on to open an adequate way, if by effective levees the vast volume of water were kept in its proper course. On this principle the perfect completion of all necessary levees is demanded, as protection for bottom-lands in danger from floods; and on the same principle was carried out, by means of Jetties (q.v.), after the plans and under the direction of Capt. James B. Eads (q.v.), a most effective opening of a channel 30 ft. deep and 350 ft. wide, through the S. Pass into the Gulf, where before there existed a bar of sand and silt, with only $8\frac{1}{2}$ ft. in depth of water. The chief shoals in the M. are on six extensive reaches, of which the Plum Point and Lake Providence are the worst. The former lies between Cairo and Memphis, extending 38 m. from Island No. 26 to Randolph, where the river widens in places to 10,000 ft., with a minimum depth of $4\frac{1}{2}$ ft. The Lake Providence reach extends 25 m., from Skipwith's Landing, La., to the foot of Island No. 95. For such reaches of bad navigation a complete remedy is found in narrowing the channel by means of Dikes (q.v.), and by revetments protecting endangered banks from caving. It has been estimated that a continuous low river channel, with a minimum depth of 10 ft. on all shoals and bars, could be secured, from Cairo down to the head of the Passes, by the expenditure of $34,000,000. The alluvial deposits which were once carried as sediment by the sea-like river of geological times, and now fill the basin 50 or 60 m. wide, between the bluff formations which were the earliest banks of the flood, are 25 to 60 ft. in depth. The entire theory on which the levee system rests is questioned by a few investigators, who consider that levees tend to raise the whole bed of the river rather than to lower it.

MISSISSIP'PI SCHEME: gigantic commercial scheme, projected in France by John Law (q.v.), of Lauriston, 1717; collapsed 1720. Its primary object was to develop the resources of the province of Louisiana and the country bordering on the Mississippi, a tract at that time believed to abound in the precious metals. The company was incorporated 1717, August, under the designation *Company of the West*, and started with a capital of 200,000 shares, of 500 livres each (somewhat less than $100). The company obtained the exclusive privilege of trading to the Mississippi, farming the taxes, and coining money. The prospectus was so inviting, that shares were eagerly bought; and when, 1719, the company obtained the monopoly of trading to the E. Indies, China, the South Seas, and all the possessions of the French E. India Company, the brilliant vision opened to the public gaze was irresistible. The *Company of the Indies*, as it was then called, created 50,000 additional shares, but a rage for speculation had seized all classes, and there were at least 300,000 applicants for the new shares, which consequently rose to an enormous premium. Law, as director-general, promised an annual dividend of 200 livres (nearly $40) per share, which, as the shares were paid for in the depreciated *billets d'état*, amounted to an annual return of 120 per cent. The public enthusiasm rose to absolute frenzy, and Law's house, and the street in front of it, were daily crowded with applicants of both sexes and of all ranks, who were content to wait for hours, nay, for days together, to obtain an interview with the modern Plutus. While confidence lasted, a factitious impulse was given to trade in Paris; the value of manufactures was increased fourfold, and the demand far exceeded the supply. The population is said to have been increased by hundreds of thousands, many of whom were glad to take shelter in garrets, kitchens, and stables. But the regent had meanwhile caused the paper circulation of the national bank to be increased as the M. S. stock rose in value, and many wary speculators, foreseeing a crisis, had secretly converted their paper and shares into gold, which they transmitted to England or Belgium for security. The increasing scarcity of gold and silver becoming felt, a general run was made on the bank. The M. S. stock now fell considerably, and despite sundry desperate efforts, which had momentary success, to keep up its credit, it continued to fall steadily and rapidly. 1720, Feb., the National Bank and the Company of the Indies were amalgamated; but though this gave an upward turn to the share-market, it failed to put the public credit on a sound basis. Several useless attempts were made to mend matters; and those suspected of having more than a limited amount (fixed by a law passed at the time) of gold and silver in their possession, or of having removed it from the country, were punished with utmost rigor. The crisis came at last: 1720, July, the bank stopped payment, Law was compelled to flee the country, and a

share in the Mississippi Scheme with difficulty brought 24 livres (less than $4.50). An examination into the state of the accounts of the company was ordered by government; much of the paper in circulation was cancelled; and the rest was converted into 'rentes' at an enormous sacrifice.

MISSISSIP'PI SOUND: arm of the Gulf of Mexico, extending across from Mobile Bay to near New Orleans. It is cut off from the n. side of the Gulf by a chain of long islands—Dauphin, Petit Bois, Horn, Ship, Cat, and Isle au Pied. They are sandy and wooded, and Cat is fortified. These islands afford sheltered harbors, and good sailing between their n. shores and the mainland. The gateway of the Mississippi Sound into Mobile Bay is by Grant's Pass, and vessels reach New Orleans by way of Lake Pontchartrain. Lake Borgne, toward the w., is entered from the Sound at St. Joseph's Island.

MISSISSIPPI, UNIVERSITY OF: the state university, chartered in 1844 and first opened in 1848, situated near Oxford. During the civil war (1861-5) all exercises were suspended, and two members of the faculty appointed custodians of the university property. In 1872, the present organization in separate schools with optional studies was adopted, and courses leading to other degrees besides bachelor of arts were offered; in 1881, the law school was established. There are, therefore, now two departments: (1) the Department of Science, Literature and Arts; (2) the Department of Professional Education. The first includes 25 schools grouped into distinct courses or lines of study, providing instruction in the languages, history, science, mathematics, political economy, philosophy, pedagogy, and engineering; the degrees conferred are bachelor of arts, bachelor of science, bachelor of philosophy, bachelor of pedagogy, bachelor of mining engineering, bachelor of electrical engineering, and bachelor of civil engineering; there are also post-graduate courses in this department leading to the degrees of master of arts and doctor of philosophy. The second department included in 1903 only the law school. In 1900, the summer term of the university was begun. In 1882, women were admitted to all classes upon the same conditions as men, but were not allowed to lodge on the campus; in 1902, a special home for women students was erected. In the same year additional dormitories were built for men. The library has a special building of modern architecture, and numbers 17,000 volumes; there is also a law library of about 2,000 volumes in the law building. Until 1880 the university was supported by annual appropriations of the legislature; since that time the income has been derived from the federal grant of land, a second township being added to the original grant in 1894; the state has given occasional appropriations for buildings and improvements. The students number about 250 annually, the faculty 13.

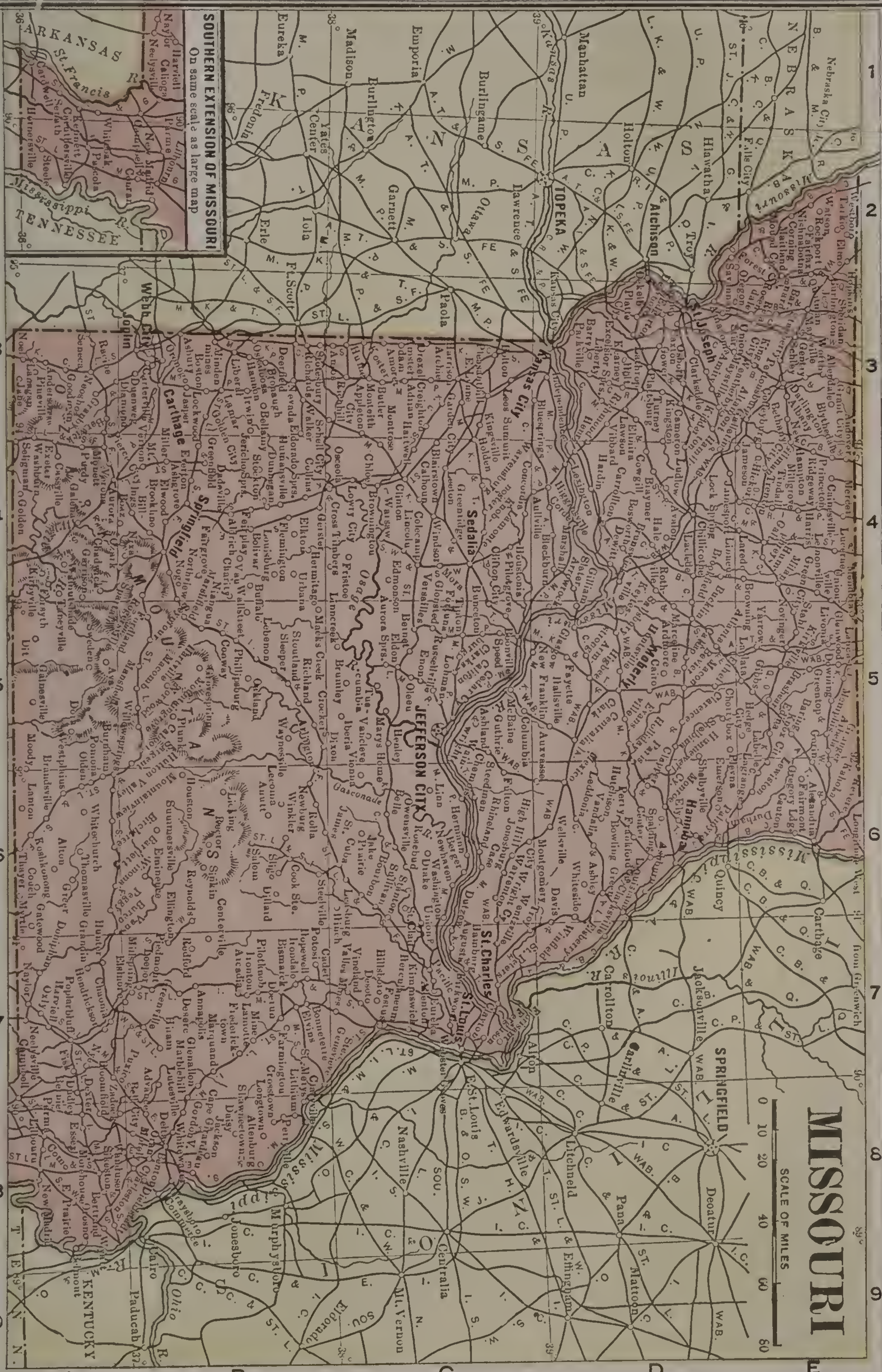
MISSIVE, n. *mĭs'sĭv* [F. *missive,* a letter—from L. *missus,* sent: It. *missiva,* a missive]: a letter sent; a message. In Scotch law, a memorandum (see MINUTE; LETTERS): ADJ. intended to be sent; prepared for sending out. LETTER-MISSIVE (see COUNCIL, in Congl. Church Usage).

MISSOLONGHI, *mĭs-sō-lŏng'ghē,* or MESOLONGHI, *mē-:* small town of Greece, govt. of Ætolia, on the n. shore of the Gulf of Patras, 24 m. w. of Lepanto. It is memorable chiefly for the two sieges which it underwent during the war of independence. In 1822, it was invested by land and sea by the Turks, who, after a siege of two months, were compelled to withdraw. In 1826, it was again besieged by an overwhelming Ottoman force; and after ten months of resistance and suffering, its garrison, reduced from 5,000 to 3,000 fighting men, cut their way through the ranks of the enemy, carrying with them a great number of the women and children. The Turks then entered the town, which was almost totally destroyed. Here Lord Byron died 1824. Pop. over 6,000.

MISSOULA, *mĭ-zō'la:* Montana, city, county-seat of Missoula county; situated on both sides of the Hell Gate river, a tributary of the Columbia river, and on the Northern Pacific railway, in a beautiful and fertile valley, called by the early settlers Hell Gate Ronde. The city has an elevation of 3,201 feet above sea level, and is situated in 46° and 52′ north latitude, and in longitude 113° and 50′ west. The climate is salubrious, the winters being mild, and the summer and fall delightful. The average annual rainfall is about 16 inches. The city was founded in 1864, the first house, a log cabin, being built that year. The pioneer merchants of Missoula were Worden & Co., who built, in 1865, grist and saw mills, and erected and opened a store. The place at that time was called Missoula Mills, which name it retained for several years, when it was changed to Missoula. In 1883, the city was incorporated by an act of the legislature, having a mayor and city council. It is situated in the centre of a fine agricultural, fruit and lumbering region, and a large mining region is tributary thereto. Missoula is the seat of the State University of Montana, which was opened in 1895. There are two hospitals in the city, one of them maintained by the Northern Pacific railway and its employees, in which the employees of the company are treated; the other one is owned and maintained by the Sisters of Charity of the Catholic Church and called Saint Patrick's Hospital. The same Sisters of Charity have a very large academy called the Sacred Heart. A commercial college is also located here, and the city has a splendid system of public schools. The new public library building is well supplied with books. There are many wholesale and retail stores, and a large mercantile business is done in supplying the local trade, and also in supplying the various mining and lumbering re-

Area in Square Miles, 69,415. Population, 3,106,665.

Number of Counties, 115. Capital of State, Jefferson City.



gions tributary to the city. There are two large manufacturing establishments engaged in the manufacture of doors, sash, blinds, dressed lumber, and other building materials; also one brewery, one flouring mill, bottling works, and other manufacturing establishments. The city supports two national and one private bank; it also has 10 churches of different denominations, and a large number of lodges of fraternal organizations, and sustains a Business Men's Club. Fort Missoula, a United States military post, 4 miles west of the city, is garrisoned by four companies of infantry troops. The city is the trade centre for a large section of country, and ships large quantities of grain, fruit, hay, live-stock, wool and lumber. The Flathead Indian Reservation, which by an act of congress was directed to be surveyed and opened for settlement, lies about 15 miles north of the city, and contains approximately 1,750,000 acres of fine agricultural, grazing and timber lands. This body of land is now being surveyed by the United States government, preparatory to being thrown open to settlement, all of which will be tributary to the city. Pop. (1910) 12,869.

MISSOURI, *mĭs-sō'rĭ:* a state; one of the United States of America; 11th in order of admission into the Union; 5th in population in 1880, 5th in 1890, and 5th in 1900; 10th in railroad mileage; 7th in value of manufactures in both 1890 and 1900; in 1902, 3d in production of corn, 2d in hay, 2d in number of mules. Popularly known as the 'Pennsylvania of the west'; named from the Missouri river. Pop. (1910) 3,293,335.

Location and Area.—Missouri is in lat. 36°—40° 30′ n., long. 89° 2′—95° 42′ w.; bounded n. by Iowa, e. by Illinois, Kentucky, and Tennessee, s. by Arkansas, w. by Oklahoma, Kansas, and Nebraska; extreme length n. and s. 277 m., extreme breadth 312 m., mean breadth 208-244 m.; 69,415 sq.m. (44,425,600 acres); Mississippi river frontage about 500 m.; cap. Jefferson City.

Topography.—In general, the n. portion is level, and the s. undulating and rising gradually to the Ozark mountains. Along the Mississippi river, from Cape Girardeau to the mouth of the St. François river, lies the Great Swamp, with more than 100 m. in Missouri, the most extensive of the numerous swamps in this region, and a marked feature of the Missouri bottom-lands. The bottom also contains many small islands, lakes, and lagoons, some of the former being above inundation-mark. Where there is any considerable amount of soil in this region, it is very fertile. In the basin of the Osage river the surface becomes rolling prairie, and above it bears noticeable forest growths; while the valley of the Missouri river has a rich alluvial soil, and abounds in forest trees of large size. Broad valleys stretch between the Mississippi and Missouri rivers; woodlands occur chiefly on the margins of water-courses; and the treeless, upland prairies comprise about nine-tenths of the entire state.

MISSOURI.

The drainage of Missouri is chiefly by the Mississippi river, which forms its entire e. boundary, and is navigable the year round, excepting when obstructed by ice; the Missouri, which nearly bisects the state, flowing from the n.w. corner to the Mississippi, to a point just below Alton, Ill., and navigable like the Mississippi; the Osage, which flows into the Missouri on the s., and is navigable for small steam-boats half the year; and the St. François, White, Black, Gasconade, Grand, Chariton (all navigable for small boats in the open season), Salt, South Grand, Platte, Nodaway, Sac, Meramee, Cuivre, Castor, and Niangua (non-navigable streams). The Missouri river forms the w. boundary of Missouri for nearly 200 m., and is a rapid, turbid stream, more than half a m. wide at its mouth, and through the greater part of its course wider still; and though draining an enormous stretch of country and receiving many large tributaries, it is exceedingly shallow at certain seasons. The Des Moines river forms a part of the n.e. boundary of the state.

Climate.—Missouri is subject to great extremes of heat and cold, the thermometer ranging from 100° above zero to 8° below; but these extremes are infrequent and of short duration, and the climate is healthful, with a generally dry, pure, salubrious air. The summers and winters of Missouri closely resemble those of Mississippi. The temperature at St. Louis ranges in winter from 30° to 43°, and in summer from 75° to 80°, with average rainfall 42 inches; annual mean temperature at Jefferson Barracks 55.46°, rainfall 37.83 inches. The river-bottoms and swamps in the s.e. are malarious, and the Missouri river for several weeks in winter is generally frozen so hard as to be safely crossed by loaded wagons.

Geology.—The main formations are quaternary, with alluvium, bluff, and drift; carboniferous or coal measures; Devonian rocks, Hamilton and Onondaga groups; upper Silurian, in four groups, and lower, in three; magnesian limestone, three groups; and eozoic or archaic rocks. The mineral riches of Missouri are greater than those of any other state. Some gold is found in the drift-sands of the n. portion, and some silver in combination with lead in the galena ores. The coal measures predominate, and are followed by iron (bog in the s.e.; brown hematite in the s.; red hematite in the coal measures; spathic ores in the coal measures and in Phelps county; specular oxide in the Iron Mountain, Shepherd Mountain, Simmon Mountain, and the Pilot Knob districts; sulphurets in the coal measures; and sulphates there and in abandoned coal mines); lead, chiefly in the s.e. and the s.w. portions; nickel and cobalt, in Madison county and the St. Joseph mines; and millerite, near St. Louis. Besides these, large quantities of wolfram, carbonate of lime, pearl-spar, fluor-spar, felspar, sulphate of baryta, gypsum, mica, asbestos (in Madison county), mineral

tar, potter's clay, fire-clay, kaolin, sand-glass, hydraulic lime and cement, saltpetre, grindstones, white and colored marbles, slates, millstones, granite, and a variety of building stones, are found. The principal mineral springs are sulphurous, saline, and chalybeate.

Zoology.—The mountains abound in wolves, raccoons, opossums, and foxes, and other wild animals; game animals are deer, rabbits, squirrels, hares, wild turkeys, quails, pigeons, prairie hens; eagles, vultures, owls, and hawks are frequently seen; wild geese, ducks, brant, teal, herons, and swans are plentiful in season in the principal rivers and swamps; and snakes, lizards, toads, frogs, and turtles frequent the bottoms and swamp-lands. There is also a large variety of song and plumage birds.

Agriculture.—The staple products of M. are wheat, oats, Indian corn and tobacco, but in the s. portions of the state cotton, hemp, and flax are also raised to an appreciable extent. The flour from M. wheat is in great demand, owing to its remarkably fine quality. All kinds of grass which favor the raising of stock grow luxuriantly, while on account of the cheapness of corn the raising of pork is an important industry. In the s. the rearing of sheep is also carried on with profit. All kinds of fruit are successfully cultivated, not only the more hardy varieties, such as apples, pears, plums and cherries, but also those requiring a softer climate, such as apricots, nectarines, figs, and many varieties of grapes. The latter are cultivated with particular success in the s. part of the state, and from them large quantities of wines are made, so that in the production of both red and white wines M. compares well with practically any state in the Union. In all of its chief crops M. ranks well to the fore among the states, while besides those already mentioned large crops of barley, rye, buckwheat, potatoes, and hay are also secured annually. Altogether there are in M. about 25,000,000 acres of improved land and about 9,000,000 acres of unimproved. The total value of all farm property, including lands, buildings, and improvements, implements and machinery, and live stock is approximately $1,500,000,000.

Manufactures.—There are well over 6,500 manufacturing establishments in M., producing goods whose aggregate value is approximately $500,000,000. The leading industries are slaughtering and meat packing, flour and grist-mill products, tobacco products, malt liquors, boots and shoes, foundry and machine-shop products, lumber and timber products, and men's clothing. St. Louis produces about three-fourths of the manufactured products of the state.

Commerce and Transportation.—River transportation is now extensive, large quantities of cereals especially being shipped from St. Louis to New Orleans and thence transferred to ocean-going steamers. M. also has a

large domestic commerce, shipping enormous quantities of cereals, pork, beef, live stock, manufactures, and merchandise by rail and river from St. Louis; and grain, live stock, wool, hides and pelts, ores, pig-iron, bullion, and packed meat from Kansas City.

Many very important lines of railroads traverse the state, connecting at different points with the great trunk lines leading to all parts of the country. Altogether there are nearly 8,500 miles of track in the state.

Mining.—M. has large deposits of coal, iron, lead, zinc, and clays for the manufacture of the ordinary brick and for fire-brick. Its coal mines are easily worked, and include upper, middle, and lower measures. In the upper measures are about 4 ft. of coal, which is found within an area of about 8,400 square miles. In the middle coal measures there are about 7 feet of coal within an area of about 2,000 square miles. The coal in the lower measures is found in several seams bearing from 1½ ft. to 4½ ft. in thickness. The annual output of bituminous coal is worth more than $6,000,000. The supplies of iron ore are practically inexhaustible, the greatest deposits being found in Iron Mountain in the s.e., Shepard Mountain, Pilot Knob, the Nova Scotia Iron Banks, and Iron Ridge, while smaller deposits are found throughout the hilly regions of the s. section of the State. Lead is found in vast deposits in the same region, being found in the magnesian limestone, and although the percentage of lead in the ore is small, when worked upon a large scale, a good profit ensues. The great lead section through which lead ore is very generally disseminated, occupies about one-half of the n. portion of Madison county, and a somewhat larger portion in St. Francois county. The great lead mines of Granby were, in the early days of the lead industry in M., the best known in the state, and millions of pounds of lead have, from time to time, been taken from these lands.

Zinc is found in the shape of sulphide, and also silicate of zinc, in nearly all the lead mines of s.w. M. Thirty-five years ago it was found in such masses as to hinder mining operations and, on account of the lack of railroad facilities, it was thrown aside as worthless until large quantities had collected. Of later years, however, zinc has been an important and profitable adjunct of the state's lead mines. Small quantities of cobalt and some nickel are found in the lead mines of the s.e. Building stone of all kinds, including marble, limestone, sandstone, and both red and gray granite, abound in M., and constitute an important item in the mineral resources of the State. Among the marble deposits is a notable cave, the entrance to which is on the summit of Roark Mountain, in Stone county, 18 miles s.e. of Galena and 3 miles n. of White river. It contains a beautiful chamber 150 ft. high;

a stalagmite 300 ft. in diameter at the base, 130 ft. high; and within the stalagmite, 60 ft. from its base, a chamber 30 x 40 ft.; and a pool of clear water 15 ft. in diameter. The top of the chamber is dome-shaped, and about two-thirds of the way up is an attractive tracery of fringe extending entirely around it.

Finances and Banking.—The total assessed valuation, including both personal and realty property, is $1,547,126,736, the tax rate is $1.70 per $1,000, and the bonded debt $4,398,839. There are about 125 national banks, about 900 State banks, more than 70 private banks, and about 40 loan and trust companies.

Education.—M. spends about $8,500,000 a year in maintaining its public schools, in which there are about 750,000 pupils enrolled, with about 18,000 teachers. M. has a well perfected public school system of education, adopted in 1839. The state supports normal schools and the University of M., the latter by what is called the "Permanent Endowment." Free public schools for white and colored children are required by law for every district in the State.

Religion.—The strongest denominations are the Roman Catholic, Methodist (both Northern and Southern wings), Baptist, Presbyterian (several branches), and Protestant Episcopal.

Charities and Corrections.—There is a state penitentiary at Jefferson City; a reform school for boys at Booneville; a girls' industrial school at Chillicothe; a refuge for the feeble-minded at Marshall; and state insane asylums at Fulton, St. Joseph, Nevada, and Farmington; besides a Confederate Home at Higginsville and a Federal Soldiers' Home at St. James. The state also aids the insane asylums at St. Louis to some extent.

History.—The early history of Missouri is identical with that of Louisiana (q.v.), of which territory it formed a part till 1812, when Louisiana, being admitted as a state, the remainder of the tract was erected into the territory of Missouri. Prior to this event, portions of the present state had become important and well known. Some of its lead mines were worked as early as 1720; and between that date and 1760, St. Louis, Cape Girardeau, and St. Genevieve were settled, the first as a fur-trading station. In 1775, St. Louis had population of about 800, and 1780 was attacked by a body of English soldiers and Indian allies from Michilimackinac, and was saved only by the timely arrival of Gen. Clarke, who hastened from Illinois at the call for aid. In 1817, the first steps were taken to secure admission into the Union. The petition of the territorial legislature to congress led to a bitter struggle. The question at issue was whether Missouri should be admitted as a slave or a free state. A bill was introduced into congress in 1818-19 providing that the territory should be admitted as a free state. This bill was

strenuously opposed by the southern members, who were anxious that slavery should be legalized in the new state. The first constitution prepared forbade the legislature to pass emancipation laws without consent of owners, or to prevent immigrants from bringing slaves into the state with them, and directed it to prevent free negroes and mulattoes from coming to and settling in the state under any pretext. Chiefly through the influence of Henry Clay (q.v.), a compromise was effected, by which M. was to be admitted as a slave state, on condition that from all the terr. w. of M., and n. of the parallel of 36° 30′ (the s. boundary of the new state), slavery should be excluded forever. This compromise allayed the excitement somewhat, but the 'free negro' clause in the proposed constitution revived it. The bill for admission passed the senate, but in the house a proviso was added that the state should abolish slavery, to which the senate disagreed. 1821, Mar. 2, another compromise was adopted, by which M. was to be admitted on the condition that the legislature should pledge the faith of the state that the 'free negro' clause should never be executed. June 26 following, the legislature passed a public and 'irrevocable' act in the terms required, though it declared in a preamble that the act was merely one of policy, to secure speedy admission, that the requirement of congress was unconstitutional, and that the people of the state did not intend to respect the condition so imposed. The compromise agreement was observed till virtually repealed by the bills which established the territories of Kan. and Neb. 1854; and M. was admitted by presidential proclamation 1821, Aug. 10. Excepting the part taken by some of its citizens in the Kansas (q.v.) troubles 1854-59, the history of the state was that of general prosperity till the beginning of the civil war. 1861, Jan. 16, the state senate adopted a bill providing for a convention to determine the position of the state on the question of secession. This body met in Jefferson City Feb. 28, and in St. Louis Mar. 4. The dominant feeling in the state, the legislature, and the convention, was in favor of the Union; and nothing occurred to indicate opposition to the prosecution of the war till June 12, when, in consequence of a difficulty between the federal troops sent to St. Louis, as an important military point, and the state militia, Gov. Jackson called out 50,000 state militia to 'repel invasion,' and removed with other state officers from Jefferson City to Boonville. Two days later, the federal troops, under Gen. Nathaniel Lyon (q.v.), attacked the state militia at Jefferson City and defeated them. On July 30 the convention declared the legislature dissolved, and chose a new gov. (Gamble), lieut.-gov., and sec. of state. Gov. Jackson immediately issued another proclamation, in which he declared M. to be out of the Union. More federal and some Confederate troops were at once thrown into M.; Gen. Lyon was killed in the battle of Wilson's Creek, near Spring-

field, Aug. 10; Gen. Fremont declared martial law Aug. 21; and a large Confederate force under Gen. Sterling Price, captured Lexington Sep. 20. Fremont advanced into the s.w., having several skirmishes on the way, and was succeeded by Gen. Hunter Nov. 2, and he by Gen. Halleck, as commander of the w. dept., Nov. 18. About this time nearly half the state was held by the Confederates, and an attempt was made, by some members of the old legislature, to force the state into the Confederacy. In 1862, Feb., the Confederates under Gen. Price were driven into Ark. by federal troops under Gen. Curtis; and during 1862 and 1863 the state was disturbed by guerilla warfare, mainly on the s. border. The convention of 1861, kept alive by adjournments, passed an ordinance 1863 providing for the emancipation of all slaves in the state in 1870. Late in 1864, Gen. Price again invaded M. and made a raid diagonally from s.e. to n.w., but was ultimately forced to retreat into w. Ark. In 1864, Nov., a state election was held, the state having been governed since 1861, July, by officers elected by the convention. 1865, Jan. 6, a convention assembled in St. Louis and framed a new constitution, which was adopted by the people June following; 1869 the last of the amendments (15th) to the federal constitution was ratified by the legislature; and 1875, Oct. 30, the present state constitution was adopted.

Government.—The executive authority is vested by the constitution (1875) in a gov. elected for 4 years; the legislative in a general assembly, comprising a senate of 34 members elected for 4 years, and a house of representatives of 140 members elected for two years, salary of each $5 per day and mileage, sessions biennial, limit of sessions 70 days; and the judicial in a supreme court, the St. Louis court of appeals, the Kansas City court of appeals, the state circuit courts, criminal courts, probate courts, and municipal courts. The judges and officers of the courts are elected by the people. Judges of the supreme court are elected for 10 years; of the St. Louis and Kansas City courts of appeals for 12 years; of the circuit courts for 6 years. The successive govs., with their terms of service are as follows: Alexander McNair, 1820-24; Frederick Bates, 1824-26; John Miller, 1826-32; Daniel Dunklin, 1832-36; Lilburn N. Boggs, 1836-40; Thomas Reynolds, 1840-44; John C. Edwards, 1844-48; Austin A. King, 1848-53; Sterling Price, 1853-57; Trusten Polk, 1857; H. Johnson (act'g), 1857; R. M. Stewart, 1857-61; Claiborne F. Jackson, 1861; Hamilton R. Gamble, 1861-64; Thomas C. Fletcher, 1865-69; Joseph W. McClurg, 1869-71; Benjamin Gratz Brown, 1871-73; Silas Woodson, 1873-75; Charles H. Hardin, 1875-77; John S. Phelps, 1877-81; Thomas T. Crittenden, 1881-85; John S. Marmaduke, 1885-87; Allen G. Morehouse, 1887-89; David R. Francis, 1889-93; William J. Stone, 1893-97; L. V. Stephens, 1897-1901; Alexander M. Dockery, 1901-5; J. W. Folk, 1905-9; H. S. Hadley, 1909-

MISSOURI.

Politics.—State, congressional, and presidential elections are held Tuesday after first Monday in Nov. Officers and men in the U. S. army, and inmates of asylums, poor-houses, and prisons, are excluded from voting. M. has 18 electoral votes. Her votes for pres. and vice.-pres. have been as follows: 1824, Henry Clay and Andrew Jackson, 3; 1828, Andrew Jackson and John C. Calhoun; 1832, Andrew Jackson and Martin Van Buren, 4; 1836, Martin Van Buren and Richard M. Johnson; 1840, Martin Van Buren and Richard M. Johnson; 1844, James K. Polk and George M. Dallas, 7; 1848, Lewis Cass and William O. Butler; 1852, Franklin Pierce and William R. King, 9; 1856, James Buchanan and John C. Breckinridge; 1860, Stephen A. Douglas and Herschel V. Johnson; 1864, Abraham Lincoln and Andrew Johnson, 11; 1868, U. S. Grant and Schuyler Colfax; 1872, Thomas A. Hendricks 6, B. Gratz Brown 8, and David Davis 1, for pres., and B. Gratz Brown 6, George W. Julian 5, J. M. Palmer 3, and William S. Groesbeck 1, for vice-pres.; 1876, Samuel J. Tilden and Thomas A. Hendricks, 15; 1880, Winfield S. Hancock and William H. English; 1884, Grover Cleveland and Thomas A. Hendricks, 16; 1888, Grover Cleveland and Allan G. Thurman, 16; 1892, Grover Cleveland and Adlai E. Stevenson, 17; 1896, William J. Bryan and Arthur Sewall, 17; 1900, William J. Bryan and Adlai E. Stevenson, 17; 1904, Theodore Roosevelt and Charles W. Fairbanks, 18; 1908, W. H. Taft and J. S. Sherman, 18.

MISSOU'RI RIVER: the great head stream which forms by union with the upper Mississippi river and the Ohio river. The name signifies Mud river, and the character of the water known for more than 1,200 m. of the Mississippi, from the Gulf of Mexico, is given by the M. Below the confluence of the two streams, 16 m. above St. Louis, the separate volumes of the upper Mississippi and the M. flow side by side for a long distance without mingling, and it is plain to the eye which is the great river and which will be lost in the other. The lower reach of the M. is of about 400 m. across the state of Mo., in a generally e. direction. From Kansas City n. it is the w. boundary of the state, and beyond the n.w. corner of Mo. the ascent of the stream is generally e. and w., past the mouth of the mouth, and thence n.w. and n. across S. Dak. and more than half of N. Dak. From this point the line of the stream is generally e. and w., past the mouth of the Yellowstone, a great navigable tributary, and far on to the foot-hills of the Rocky Mts., where the Great Falls occur, a succession of four within 16½ m.; the successive perpendicular rises being 87 ft., 19 ft., 47 ft., and 26 ft. The rapids connecting the cataracts increase the whole rise to 357 ft. The ascending course of the stream penetrates the Rocky Mts. 145 m. further on, by a narrow gorge, 5¾ m. long, 450 ft. wide, and with walls of rock rising perpendicularly 1,200 ft. directly from the water. The source is 400 m. beyond these 'Gates of

the Rocky Mts.,' in the confluence of two small streams, the Jefferson and Wisdom, of which the latter rises within a mile of the head springs of Clarke's fork of the Columbia. The stream thus formed is joined 80 m. down by the Gallatin and Madison, and this confluence of three rivers is by some regarded as the starting-point of the M. The higher point is at the boundary between Mont. and Ida., lat. 45° 15′ n., and long. 110° 30′ w.; and for nearly 2,000 m., descending the river, the course is through Mont., N. Dak., and S. Dak., after which it has Io. and the n. part of Mo. on its left bank, and Neb. and Kan. on its right, until, at Kansas City, it passes into and across Mo., to its mouth, 2,908 m. from the lower source, or 2,988 from the highest, and 1,286 m. from the fall of its muddy waters into the Gulf of Mexico. The width of the M. is 1,500 ft. at Fort Benton, 2,500 ft. at Sioux City, and 3,000 ft. from St. Joseph to its mouth. The highest source is not far from 7,000 ft. above sea-level; that at Fort Benton 2,845 ft.; at Sioux City 1,065 ft.; at St. Joseph 756 ft.; and at its mouth 381 ft. The mouth of the M. is 159 m. above the passage of the trunk river into the head of the Mississippi alluvial basin, and 189 m. above the mouth of the Ohio. Navigation on the M. is regular to the mouth of the Yellowstone, on the border of N. Dak. and Mont., and it may extend as far as the Great Falls. The Yellowstone, a navigable river for about 300 m., is the largest tributary of the M., and lower down other tributaries on the right are the Little Missouri, Big Cheyenne, White Earth, Niobrara, Platte or Nebraska, Kansas and Osage. On the left it receives the Milk, Dakota, Big Sioux and Little Sioux. All the great streams which rise on the e. side of the Rocky Mts., except the Arkansas, thus send their waters into the M., which, with its large share of the streams between it and the upper Mississippi, drains an area of 518,000 sq. m. The upper course of the M. is through a dry and open country, where at certain seasons the rapid evaporation of the water leaves portions of the stream shallow. The elevation of the sources is about 7,500 ft. above sea-level; and that of the stream at the mouth of the Yellowstone is 2,010 ft.; and the general flow of the water is rapid. On the lower course of the river its channel is cut through a rich alluvial valley, back of which, on either side lie extensive prairies. At its mouth the M. is over half a m. wide, and in many places higher up the width is much greater.

MISSOURI, UNIVERSITY OF, the state university located at Columbia, Boone county. It was chartered by the legislature in 1839, the cornerstone of the main building was laid in July, 1840, and instruction in academic work was begun in 1841. The organization comprises eight departments: (1) Graduate department, established 1896; (2) academic department; (3) department of education (1868); (4) law (1872); (5) medicine (1873); (6) military science and tactics (1890);

(7) college of agriculture and mechanic arts (1870); (8) school of mines and metallurgy (1870), situated at Rolla. The college of agriculture includes the school of agriculture, the school of engineering and the state experiment station. The school of engineering offers courses in civil, electrical, mechanical, sanitary, chemical and hydraulic engineering; the course in the school of mines includes mining and civil engineering. The degrees conferred are bachelor of arts, bachelor of laws, bachelor of science (in the college of agriculture and the mechanic arts, and the school of mines and metallurgy), and doctor of medicine; also the graduate degrees, master of arts, doctor of philosophy, master of science, master of laws, civil engineer, electrical engineer, mechanical engineer, sanitary engineer, and engineer of mines. In 1869 women were admitted to the normal department (department of education), in 1870 to the academic department, and soon afterward to all existing departments; they are now admitted on equal terms to all departments except the department of military science and tactics. A dormitory for women has been erected on the horticultural grounds which adjoin the regular campus. The University library includes the general library, 10 departmental libraries and the library of the school of mines. There being no special library building, the general library, the classical library, the political science library and the romance library are in Academic Hall; other departmental libraries are in the buildings of their respective departments, the library of the school of mines being at Rolla; these libraries contained in all about 75,000 volumes in 1906. There are rooms in Academic Hall set apart for gymnasium work for men and women, and there is also an athletic field; competitive athletics and inter-collegiate contests are encouraged, and though regarded as essentially a student enterprise, are under supervision of the faculty. In 1868 the state for the first time gave aid to the University, and has since made several appropriations for special purposes; the endowment is about $2,500,000; and the annual income is about $400,000. The students numbered 2,072 in 1905-6, and the faculty, 145.

MISSPEAK, v. *mĭs-spēk'* [*mis*, wrong, and *speak*]: in *OE.*, to blunder in speaking.

MISSPELL, or MISSPEL, v. *mĭs-spĕl'* [*mis*, wrong, and *spell*]: to write with wrong letters; to spell wrongly. MISSPELL'ING, imp.: N. a wrong spelling. MISSPELLED', pp. *-spĕld'*, or MISSPELT', pp. *-spĕlt':* ADJ. wrongly spelt.

MISSPEND, v. *mĭs-spĕnd'* [*mis*, wrong, and *spend*]: to waste and consume to no purpose; to spend badly. MISSPEND'ING, imp. MISSPENT, pt. *-spĕnt:* ADJ. wasted; consumed to no purpose.

MISSTATE, v. *mĭs-stāt'* [*mis*, wrong, and *state*]: to state wrongly; to represent falsely. MISSTA'TING, imp. MISSTA'TED, pp. MISSTATE'MENT, n. *-mĕnt*, an erroneous representation, whether verbal or written.

MIST, n. *mĭst* [Icel. *mistr*, a foggy darkness in the air: Dut. *miest* and *mist*, mist; *mieselen*, to exhale a mist, to rain fine: Ger. *mist*, dung, mist]: the vapor of water hanging over sea or land, less dense than a fog (q.v.); vapor floating and falling in fine particles in the form of very small rain; that which dims or obscures, or intercepts vision, as if it were a vapor or a mist: V. in *OE.*, to cover with vapor; to cloud. MIST-LIKE, having the appearance of mist; misty. MISTY, *mĭst'ĭ*, a. overspread with mist; dim or obscure. MIST'FUL, a. *-fûl*, clouded with mist. MIST'ILY, ad. *-ĭ-lĭ*, darkly; obscurely. MIST'INESS, n. *-ĭ-nĕs*, state of being misty; obscurity.

MISTA'EN, pp. *mĭs-tān'*: a poetic spelling for MISTAKEN.

MISTAKE, v. *mĭs-tāk'* [*mis*, wrong, and *take:* Icel. *mistaka*, to take by mistake—from *taka*, to take]: to misunderstand; to conceive wrongly; to take one person or thing for another; to err in opinion or judgment: N. an error of any kind; a misconception; a blunder; an oversight. MISTA'KING, imp.: N. in *OE.*, an error. MISTA'KEN, pp. *-tā'kn*, wrong or in error, as applied to persons (this application to *persons* is a popular usage, but of doubtful propriety): misunderstood, as applied to things: ADJ. erroneous; wrongly judging; incorrect. MISTOOK, pt. *mĭs-tûk'*, did mistake. MISTAKABLE, a. *mĭs-tā'kă-bl*, that may be mistaken. MISTA'KENLY, ad. *-lĭ*. MISTA'KINGLY, ad. *-lĭ*. BY MISTAKE, under error or misapprehension; unintentionally. NO MISTAKE, *familiarly*, without fail; without possible error; with certainty. TO BE MISTAKEN, properly, to be taken wrongly, i.e., to be misunderstood; also popularly, but with doubtful propriety, to misunderstand, to commit an error of judgment; to be deceived.

MISTAKE', in Law: an error which may be due to ignorance, forgetfulness, carelessness, undue confidence in another, etc., which leads to the omission of something which should have been performed, or to the commission of an act which would not otherwise have been done. There are two classes of mistakes; those of law, and those of fact, which are very differently treated. The great principle that ignorance of the law is no excuse for wrong-doing is maintained in courts both of law and of equity. If this were abandoned many people would prefer to remain ignorant of matters concerning which they should be informed. If the M. is purely legal the law must take its course, even though the results of an act are radically different from those anticipated. But when there are such causes for the M. as incapacity, fraud, undue influence, or imposition, a court of equity may set aside the contract. When there is no fraud, either of act or of intent, but an error is held in common by both parties to a transaction, a compromise will usually be sustained by the court. The same is true of compromises of contested claims to estates. A M. in regard to the law of a foreign country is subject

to rectification on the ground that it is not obligatory on a resident of one country to study the laws of another. And a M. in law may be accepted as an excuse when a man has promised to perform a certain act because he supposed that it was obligatory on him to do so when no such claim existed. Mistakes of fact are much more readily corrected than are those of law. When an error shared by both parties is committed in ignorance of some important fact bearing on the case, relief can usually be secured through the courts, even though no fraud or deception has been attempted; but the facts must be of such importance as to exercise a determining influence on the transaction. The M. may be rectified by a return of the property to the former owner, or when that is impossible, by an imposition of money damages for any deficiency which may be found to exist. When the M. is on only one side, and there has been no fraud, legal relief cannot usually be secured. The means of information being open to both parties, each is supposed to look after his own interests. But where a party having apparent reason to do so, reposes confidence in another and is misled by the concealment of some important fact, he may be able to obtain redress from the courts of equity. Legal instruments, agreements, etc., which contain material errors and fail to set forth the intention of the parties may be corrected by order of the court, but this does not apply to a M. of law in which the language of the contract carries a different meaning from what the parties accepting it expected.

MISTASSINI, *mĭs-tăs-sē′nē*, LAKE: large lake in the s. part of N. E. Territory, Canada. The Territory extends from the n. side of the province of Quebec up the whole e. side of Hudson's Bay; and the lake is the head-water of Rupert's river, which flows w. into the s. arm of Hudson's Bay, James's Bay. The direction of the lake from Quebec is a little w. of n., and the situation is just beyond and close to, the Wotchish Mts., and directly opposite the head of an e. branch of the Saguenay river. Its dimensions are not accurately known; but it is probably about 100 m. long and 15 to 30 or 40 m. wide, but of irregular outline.

MISTAUGHT, v. *mĭs-tawt′* [*mis*, wrong, and *taught*]: pt. and pp. of *misteach;* wrongly taught.

MISTEACH, v. *mĭs-tēch′* [*mis*, wrong, and *teach*]: to instruct wrongly. MISTEACH′ING, imp. MISTAUGHT′, pt. and pp., which see.

MISTER, n. *mĭs′tėr* [a misspelling of *master*—from L. *magister*, a master]: a common title of address to any adult male, contracted into Mr.

MISTER: for MYSTER, trade; craft: see MYSTER.

MISTERM, v. *mis-tėrm′* [*mis*, wrong, and *term*]: to name erroneously.

MISTHINK, v. *mĭs-thĭngk′* [*mis*, wrong, and *think*]: in *OE.*, to think ill or wrongly. MISTHOUGHT′, n. *-thawt′*, a false opinion; a wrong thought.

MISTILY, MISTINESS: see under MIST.

MISTIME, v. *mĭs-tīm′* [*mis*, wrong, and *time*]: to arrange ill as to time; not to adapt to the time. MISTI′MING, imp.: N. the doing at a wrong time, or unseasonably. MISTIMED′, pp. *-tīmd′:* ADJ. done out of season or at a wrong time.

MISTITLE, v. *mĭs-tī′tl* [*mis*, wrong, and *title*]: to designate by a wrong title or name. MISTI′TLING, imp. *-tī′-tlĭng*. MISTI′TLED, pp. *-tī′tld*.

MISTLETOE, or MISLETOE, or MISSELTOE, n. *mĭz′l-tō* [Icel. *mistelteinn;* AS. *misteltan;* Dut. and Ger. *mistel*, the mistletoe—the latter part is the Icel. *teinn*, a prong of metal: Norw. *tein;* Goth. *tains*, the shoot of a tree, a twig]: genus (*Viscum*) of small parasitical evergreen shrubs of nat. order *Loranthaceæ*. This order is exogenous, and contains more than 400 known species, mostly tropical and parasites. The leaves are entire, almost nerveless, thick and fleshy, and without stipules. The flowers of many species are showy. The calyx arises

Mistletoe (*Viscum album*).

from a tube or rim, which sometimes assumes the appearance of a calyx, and is so regarded by many botanists; what others deem the colored calyx being viewed by them as a corolla of 4 or 8 petals or segments. Within this are the stamens, as numerous as its divisions, and opposite to them. The ovary is one-celled, with a solitary ovule; the fruit one-seeded, generally succulent.—COMMON M.

(*V. album*) is a native of Britain and of the greater part of Europe, forming a bush about 4 ft. long, growing on many kinds of trees, particularly on the apple, and others botanically allied to it, as the pear, service, and hawthorn; sometimes, also, on sycamores, limes, poplars, locust-trees, and firs, but very rarely on oaks (contrary to the common belief). It is very plentiful in some parts of s. England, its evergreen leaves giving a peculiar appearance to the orchards in winter, when the bushes of M. are very conspicuous among the naked branches of the trees; but it is very local. The stems are *dichotomous* (i.e., divide by forking); the leaves are opposite, of yellowish-green color, obovate-lanceolate, obtuse. The flowers are inconspicuous, and grow in small heads at the ends and in the divisions of the branches, the male and female flowers on separate plants. The berries are about the size of currants, white, translucent, and full of a very viscid juice, which serves to attach the seeds to branches, where they take root when they germinate, the radicle always turning toward the branch, whether on its upper or under side. The M. derives its nourishment from the living tissue of the tree on which it grows, and from which it seems to spring as if it were one of its own branches. The berries are a favorite food of thrushes; and it has been supposed that the M. was propagated by the seeds deposited from the birds; the propagation is really by the wiping off of the seeds from the bird's beak which it rubs against the bark. Bird-lime is made from the seeds and bark. The M. was intimately connected with many superstitions of the ancient Germans and of the British Druids. In the northern mythology, Balder is said to have been slain with a spear of mistletoe. Among the Celts, the M. which grew on the oak was in peculiar esteem for magical virtues. Traces of the ancient regard for the M. remain in some old English and German customs, as kissing under the M. at Christmas. The M. was at one time in high repute as a remedy for epilepsy and convulsions, but it seems to possess no decided medicinal properties.—*Loranthus Europœus*, a shrub very similar to the M., but with flowers in racemes, is plentiful in parts of s. Europe, and very frequently grows on oaks.—*L. odoratus*, Nepaulese species, has very fragrant flowers. —*American Mistletoe* (*Phoradendron flavescens*) differs little from the European, and was formerly included in the same genus. It has a globular calyx, 3 (rarely 2-4) lobed; and is found on deciduous trees from N. J. to Ill. and southward. *Note.—Mistel*, the 'mistletoe,' is a dim. of Ger. *mist*, dung—probably in reference to the seeds deposited by the birds who eat the berries, or it may refer to the slime of the berries: O. Dut. *mistel*, bird-lime—see Skeat.

MISTOOK: pt. of MISTAKE, which see.

MISTRAL, n. *mĭs'trăl,* or MISTRAON, or MAESTRAL [F. *mistral;* OF. *maestral,* the mistral—from It. *maestrale*—from mid. L. *magistrālis—lit.,* the masterful wind]: Provençal designation of the *Caurus* or *Corus* of the Romans; a n.w. wind which at certain seasons of the year prevails on the s. coast of France. Its approach is heralded by a sudden change of the temperature, from genial warmth to piercing cold; the air is felt to be purer, and more easily inhaled, the azure of the sky is undimmed by cloud, and the stars shine by night with extraordinary and sparkling brightness; this last appearance is an infallible prognostic. The mistral then comes in sudden gusts, struggling with the local aërial currents, but its fast increasing violence soon overcomes all opposition. In a few hours, it has dried up the soil, dispersed the vapors of the atmosphere, and raised a dangerous tumult among the waters of the Mediterranean. The mistral blows with its greatest force from the end of autumn to the beginning of spring, and causes much damage to the fruit-trees in blossom, and often to the field-crops. It is a terror to the mariners of the gulfs of Lyon and Valence, and even the most hardy seaman makes all haste to a harbor of refuge. The most probable cause of the mistral is the derangement of atmospheric equilibrium produced by the cold condensed air of the Alps and Cevennes rushing in to supply the vacuum produced by the expansion of the air in the warm s. provinces of France, and on the surface of the Mediterranean. This wind is appropriately denominated by the Italians *Maestro.*

MISTRAL, *mēs-trâl,* FRÉDÉRIC (or FREDERI): French poet: b. Maillane, Bouches-du-Rhone, 1830, Sep. 8. He studied law for a time at Aix, but soon abandoned it, and gave his attention to writing in Provençal, the dialect of southern France, which, under the influence of Jasmin, the 'barber-poet,' had entered on a renaissance as a literary medium. In 1854, he, with six others, founded the well-known Society of the Felibrige; and in 1859 he published his *Mirèio,* a narrative poem in the recovered language, which was crowned by the Académie in 1861. A second work in verse, *Calendau,* came out in 1867; a volume of poems, *Lis Isclo d'Or* (The Isles of Gold), in 1875; *Lou Trésor dou Félibrige,* a dictionary of modern Provençal, in 1878-86; and the historical poem *Nerto* in 1884. *La Rèino Jano* (1890) is a tragedy, and *Le Poème du Rhône* (1879) another narrative poem. There are English renderings of *Mirèio* by Grant (1867), Crichton (1868), and Preston (1872). Consult: Gaston, Paris, *Penseurs et Poètes* (1896); Welter, *Frédéric Mistral, der Dichter der Provence* (1899); Downer, *Frédéric Mistral* (1901). In 1904 he received the Nobel prize in literature.

MISTRANSLATE, v. *mĭs'trăns-lāt'* [*mis,* wrong, and *translate*]: to translate erroneously. MIS'TRANSLA'TING,

imp. MIS'TRANSLA'TED, pp. MIS'TRANSLA'TION, n. *-lā'-shŭn*, an erroneous version or translation.

MISTREADING, n. *mĭs-trĕd'ĭng* [*mis*, wrong, and *tread*]: in *OE.*, a false step; the choosing of a wrong path.

MISTREAT, v. *mĭs-trēt'* [*mis*, wrong, and *treat*]: to ill-treat; to abuse. MISTREAT'ING, imp. MISTREAT'ED, pp. MISTREAT'MENT, n. *-mĕnt*, ill-treatment; abuse.

MISTRESS, n. *mĭs'trĕs* [OF. *maistresse;* F. *maîtresse*, fem. of *maître*, master: L. *magistra*, a mistress]: the fem. of *master;* a woman who instructs or governs a school; a female teacher; a woman who governs or holds authority; a woman beloved and courted; a term of address applied to a married untitled woman, now contracted into and written Mrs.; the female head of a family; a concubine; a woman who holds something in possession; a woman who has skill in something. MISTRESS OF THE WORLD, a name of Old Rome, in respect of the wide and far-reaching extent of her dominions and power. MISTRESS OF THE ROBES, a post in the queen's household, held by a lady of high rank, but its duties may often be performed by deputy—so named from having charge of the queen's robes.

MISTRUST, n. *mĭs-trŭst'* [*mis*, wrong, and *trust*]: want of confidence or trust; suspicion: V. to doubt; to suspect; to regard with suspicion. MISTRUST'ING, imp. MISTRUST'ED, pp. MISTRUST'FUL, a. *-fûl*, suspicious; wanting confidence in. MISTRUST'FULLY, ad. *-lĭ*.

MISTUNE, v. *mĭs-tūn'* [*mis*, wrong, and *tune*]: to tune wrongly; to put out of tune. MISTU'NING, imp. MISTUNED', pp. *-tūnd'*.

MISTY, MISTILY, MISTINESS. See under MIST.

MISUNDERSTAND, v. *mĭs'ŭn-dẽr-stănd'* [*mis*, wrong, and *understand*]: to take in a wrong sense; to misconceive. MIS'UNDERSTAND'ING, imp.: N. a mistake of the meaning; an error; a softer name for a quarrel; disagreement; dissension or slight difference. MIS'UNDERSTOOD', pt. and pp. *-stûd'*, did take in a wrong sense; understood wrongly.

MISUSAGE, n. *mĭs-ū'zāj* [*mis*, wrong, and *usage*]: ill-usage; abuse.

MISUSE, v. *mĭs-ūz'* [*mis*, wrong, and *use*]: to treat or use improperly; to treat ill; to use to a bad purpose: N. *mĭs-ūs'*, improper use; ill-treatment; wrong application. MISU'SING, imp. *-zĭng*. MISUSED, pp. *mĭs-ūzd'*.—SYN. of 'misuse, v.': to abuse; misapply; misemploy; maltreat.

MISWEEN, v. *mĭs-wēn'* [*mis*, wrong, and *ween*]: in *OE.*, to misjudge; to mistrust.

MISWEND, v. *mĭs-wĕnd'* [*mis*, wrong, and *wend*]: in *OE.*, to go wrong.

MISY, n. *mī'sĭ* [a miner's name]: an impure sulphate of peroxide of iron, a mineral of a fine bright-yellow color, and of friable structure.

MITÂKSHARÂ: name of several commentatorial works in Sanskrit—e.g., of a commentary on the text-book of the Vedânta philosophy, of a commentary on the Mîmânsâ work of Kumârila, of a commentary on the Br'ihadâran'yaka (see VEDA), etc. The most renowned work, however, bearing this title is a detailed commentary by Vijnânes'wara (called also Vijnânanâtha), on the law-book of Yâjnavalkya (q.v.); and its authority and influence are so great that 'it is received in all the schools of Hindu law from Benares to the southern extremity of the peninsula of India as the chief groundwork of the doctrines which they follow, and as an authority from which they rarely dissent' (cf. two treatises on the Hindu law of inheritance, translated by H. T. Colebrooke, Calcutta 1810). Most of the other renowned law-books of recent date, such as the Smr'iti-Chandrikâ, which prevails in southern India, the Chintâman'i, Vîramitrodaya, and Mayûkha, which are authoritative severally in Mithilâ, Benares, and with the Mahrattas, generally defer to the decisions of the Mitâksharâ; the Dâyabhâga of Jimûtavâhana alone, which is adopted by the Bengal school, differs on almost every disputed point from the Mitâksharâ, and does not acknowledge its authority. The Mitâksharâ, following the arrangement of its text-work, the code of Yâjnavalkya, treats in its first part of duties in general; in its second, of private and administrative law; in its third, of purification, penance, devotion, etc.; but since it frequently quotes other legislators, expounding their texts, and contrasting them with those of Yâjnavalkya, it is not merely a commentary, but supplies the place of a regular digest. The text of the Mitâksharâ has been edited several times in India. An excellent translation of its chapter 'On Inheritance,' was published by Colebrooke in the work above referred to; and its explanation of Yâjnavalkya is followed by the same celebrated scholar in his *Digest of Hindu Law.*

MI'TAU. See MITTAU.

MITCHEL, *mĭch'ĕl*, JOHN: 1815, Nov. 3—1875, Mar. 20: b. Dungiven, Ireland. He graduated, 1836, from Trinity College, and practiced law several years, meanwhile writing for the press. In 1845 he became editor of the Dublin *Nation* and about this time published the *Life of Hugh O'Neil.* In 1848 he left the *Nation* and established the *United Irishman,* which in about three months was suppressed on account of its violent revolutionary utterances, and Mitchel was sentenced to transportation for 14 years. He was taken to Bermuda, and later to Australia. He escaped, 1853, to New York, where he established a pro-slavery paper and published his *Jail Journal.* He afterward published papers in Knoxville,

Tenn., and Richmond, Va.; returned to Ireland 1874, and was elected to parliament, but was not allowed to serve. He was elected again but died at Cork before his case was decided. He edited the poems of Thomas Davis and James C. Mangan, wrote *The Last Conquest of Ireland—Perhaps*, and continued McGeoghegan's *History of Ireland*.

MITCH'EL, Ormsby Macknight, ll.d.: 1810, Aug. 28—1862, Oct. 30; b. Morganfield, Ky.: astronomer and soldier. His childhood was spent in Lebanon, Ohio, where he gained a good knowledge of Greek, Latin, and mathematics. When 13 years of age he became clerk in a store at Miami, but later returned to Lebanon. In 1825, June, he entered West Point Milit. Acad., from which he graduated 1829. Among his classmates were Robert E. Lee and Joseph E. Johnston. For two years he was assistant professor in the mathematical department of the institution and held the rank of 2d lieutenant of artillery. In 1832, he was stationed at St. Augustine, Fla., but soon resigned. He studied law, was admitted to practice in Cincinnati, and also held the position of chief engineer of a railroad. In 1834, he was chosen professor of mathematics, philosophy, and astronomy, in Cincinnati College, which position he held till 1844, when he was made director of a large observatory which had been erected in Cincinnati mainly through his efforts, and in behalf of which he had delivered many lectures and made a trip to Europe. In 1859, he became director of the Dudley observatory, Albany, N. Y., for which he had drawn the plans; but he still retained his connection with the Cincinnati institution. He invented and perfected various astronomical instruments of great value, and made a large number of important observations. At the opening of the civil war he entered the army, and 1861, Aug. 9, was appointed brigadier-general of Ohio volunteers. He fortified the city of Cincinnati, served in various southern states, and won fame in the great railroad raid of 1862 in n. Alabama. He was, 1862, Apr. 11, appointed major-general; in September of that year was assigned to the department of the south, and while actively arranging for the campaign was taken with yellow fever and died at Beaufort, S. C. The observatory which he founded at Cincinnati has been removed to Mount Lookout, has received his name, and is supported by the city. He was a most interesting and instructive popular lecturer on astronomy, and a member of scientific societies in this country and Europe. Gen. Mitchel's mind was singularly clear and penetrating, he was prompt and decisive in action, undismayed by any dangers or difficulties, and nobly devoted to high aims. He published, 1846-48, a paper devoted to astronomical matters, revised Burritt's *Geography of the Heavens*, and wrote *The Planetary and Stellar Worlds; The Orbs of Heaven; A Concise Elementary Treatise of the Sun, Planets, Satellites, and Comets;*

and *The Astronomy of the Bible.* His life was published 1865, by the Rev. P. C. Headley, and by his son, Frederick A. Mitchel, 1887.

MITCHELL: S. Dak., city, county-seat of Davidson county; on two divisions of the Chicago, M. & St. P., and on the Chicago, St. P., M. & O. railroads; southeast of the central part of the state and about 68 miles west by north of Sioux Falls. It was settled in 1879, and incorporated as a city in 1883. It is situated in an agricultural region in which wheat is one of the great crops, and considerable attention is given to raising stock for the eastern markets. The industrial establishments are railroad shops, machine shops, lumber and brick yards, stock-yards, a creamery, and grain elevators. Mitchell ships large quantities of wheat and live stock. The three banks have a combined capital of $125,000. It is the seat of Dakota University, founded in 1885 under the auspices of the Methodist Episcopal Church, and it has good public and parish schools. There are nine church edifices. The government is administered under a general law charter of 1890, and is vested in a mayor who holds office two years, and a council of eight members, four of whom are elected each year. The waterworks are owned and operated by the city. Pop. (1890) 2,217; (1900) 4,055; (1910) 6,515.

MITCHELL, Clifford, M.D.: American physician: b. Nantucket, Mass., 1854, Jan. 28. He was graduated at Harvard in 1875; studied medicine in Chicago in the Medical College and the Homœopathic Medical College; began to practise in Chicago in 1878; and devoted himself to diseases of the kidneys. In 1902, he established the Chicago Laboratory for Clinical Diagnosis. He is professor of chemistry, toxicology and renal diseases in the Chicago Homœopathic College and author of *Student's Manual of Urinary Analysis* (1879), *Physician's Chemistry* (1884), *Dentist's Manual of Special Chemistry* (1887), *Renal Therapeutics* (1898), and *Diseases of the Urinary Organs* (1903), etc.

MITCH'ELL, Donald Grant, LL.D. b. Norwich, Conn., 1822, Apr. 12. He studied at Ellington (Conn.) Acad., and graduated from Yale 1841. For the next three years he worked on a farm for improvement of his health. He contributed articles to the Albany *Cultivator,* and drew a set of plans for farm buildings which won a silver medal from the N. Y. Agricultural Soc. He travelled in Europe 1844-46, and in 1847 published his first book, *Fresh Gleanings.* He studied law in New York, and, 1848, again went abroad; he was at Paris when the outbreak of that year occurred, and published his observations under the title *The Battle Summer. The Lorgnette* followed, 1850, and was soon succeeded by *Reveries of a Bachelor,* which was remarkably popular, and *Dream Life,* which won nearly equal fame. He was married, 1853, and imme-

diately sailed to Venice, to which place he had been appointed U. S. consul. He published *Fudge Doings* 1854; and 1855 purchased Edgewood, a beautiful farm near New Haven, Conn., which has been made famous by his books on rural life, *My Farm of Edgewood* and *Wet Days at Edgewood.* Among his other works are *Seven Stories; Doctor Johns; Rural Studies; Pictures of Edgewood; About Old Story-tellers; Out of Town Places; English Lands, Letters, and Kings* (1889); and *American Lands and Letters* (1897). At the Paris exposition, 1878, he was U. S. commissioner. Several of his books have appeared under the authorship name 'Ik Marvel.'

MITCHELL, Elisha: American scientist: b. Washington, Conn., 1793, Aug. 19; d. on Mount Mitchell, N. C., 1857, June 27. He was graduated at Yale in 1813; four years later became professor of mathematics in the University of North Carolina; and in 1826 was made professor of chemistry, mineralogy and geology in the same institution. The Olmsted-Mitchell Geological Survey (1824-8) did important work under his supervision. He discovered that a peak in North Carolina is the highest in the eastern states and was killed by a fall from this height, which is now called in his honor Mount Mitchell or Mitchell's High Peak, and on whose summit he is buried.

MITCHELL, Henry: American civil engineer: b. Nantucket, Mass., 1830, Sep. 16; d. Boston, Mass., 1902, Dec. 11. He was a son of William Mitchell (q.v.), was educated at the Normal School in Bridgewater, Mass., and in 1851 was appointed to government service as a civil engineer under the United States coast survey. He acted as assistant to the commissioners on harbor encroachments in New York in 1859 and discovered the underflow of the Hudson. He was later engaged in Boston harbor and assisted in the improvement of the mouth of the Mississippi in 1874. He made an investigation of the Panama canal scheme under De Lesseps and held many government commissions to investigate various harbors. He was appointed professor of physical hydrology at the Massachusetts Institute of Technology in 1869, and in 1873 was offered the same post in the Agassiz School of Science but resigned. He published many reports of surveys, etc.

MITCHELL, Hinckley Gilbert, A.M., PH.D., D.D.: American Biblical scholar: b. Lee, Oneida county, N. Y., 1846, Feb. 22. He studied at Wesleyan University, where he was graduated in 1873, at the theological department of Boston University, and at the University of Leipsic. He was instructor at Wesleyan 1880-3, and from 1883-1905 was professor of Hebrew and Old Testament exegesis in Boston University. His most important publications are *Hebrew Lessons* (1884); *Amos* (1893); *The Pentateuch* (1893); *The Theology of the Old Testament*

(a translation from the French of Piepenbring, 1893); *Isaiah, Chapters i.-xii.* (1900); *The World Before Abraham* (1901); *Tales Told in Palestine,* with J. E. Hanauer; etc.

MITCHELL, JOHN: American labor leader: b. Braidwood, Will county, Ill., 1870, Feb. 4. He entered the mines at Braidwood at the age of 13, and in 1885 joined the Knights of Labor. The next few years he spent coal mining in different states of the West and Southwest, and in 1890 settled at Spring Valley, continuing his work at his trade. He read and studied constantly, and was a member of several debating societies and reform clubs; he was also active in the labor movement, and was president of the Knights of Labor local at Spring Valley. On the formation of the United Mine Workers in 1890 he became a member of that organization, was frequently delegate to district conventions and in 1895 was elected secretary-treasurer of the northern Illinois sub-district; in 1896, he was chairman of the Illinois mine workers' legislative committee, and in 1897 was made a national organizer of the United Mine Workers. In 1898, Jan., he was elected vice-president of that organization, and in September of the same year became acting president; he was elected president in 1899, and was annually reëlected until he retired in 1908; he has also been a vice-president of the American Federation of Labor since 1898. After he became president of the United Mine Workers the union was enlarged, wages increased, and the eight hour day extended; he conducted the strikes of the anthracite miners in 1900 and 1902, and brought the latter to a close by his offer in behalf of the miners to accept the decisions of a commission appointed by the President of the United States. He is also a member of the Industrial Department of the National Civic Federation.

MITCHELL, JOHN AMES: American editor and author: b. New York, 1845, Jan. 17. He was educated at Harvard and studied in Boston and Paris and was an architect in Boston in 1870-6, after which he became interested in decorative art and studied art in Paris 1876-80. Returning to New York he engaged in journalism as artist, illustrator and writer and in 1883 founded and has since edited *Life.* He has published: *Croquis de l'Exposition* (1879); *The Romance of the Moon* (1886); *The Last American* (1889); *Amos Judd* (1895); *The Pines of Lory* (1901); *The Villa Claudia* (1904); *The Silent War* (1906); etc.

MITCH'ELL, JOHN INSCHO: b. Tioga, Pa., 1838, July 28; d. 1907. He attended the common schools, and when 18 years of age entered Lewisburg Univ., where he remained two years. After teaching school he became a student in a law office, but on the opening of the civil war he entered the Union army as 2d lieutenant. He was promoted captain for bravery at Chancellorsville. After

completing his studies he was admitted to the bar 1864, was district attorney 1868-71, in the latter year was elected to the Pennsylvania house of representatives, and soon became leader of the republican side of the house. By successive reëlections he held this office till 1876, when he was elected representative to congress; he was reëlected 1878; declined renomination 1880. In 1881, he entered the U. S. senate for a term of six years. In 1900, he became a judge of the superior court of Pennsylvania.

MITCHELL, Margaret Julia ('Maggie Mitchell'): American actress: b. New York, 1832. She made her first appearance on the stage as an infant and before she was five had taken child parts. She made her début as Julia in *The Soldier's Daughter* at Burton's Chambers Street Theatre in New York, and as Fanchon, the Cricket, produced in 1860, she made herself famous. She was married to Henry Paddock, her manager, 1868, Oct. 15, and continued her career on the stage, playing in many famous roles: *The Pearl of Savoy; Nan the Good for Nothing; Jane Eyre;* etc., until her retirement.

MITCH'ELL, Maria, ph.d., ll.d.: 1818, Aug. 1—1889, June 28; b. Nantucket, Mass.: astronomer. She was taught by her father, and in the school of Prof. Pierce, in which she was also assistant teacher. When 18 years of age she became librarian of the Nantucket Athenæum, which position she held about 20 years, meanwhile pursuing mathematical and astronomical studies. From her early years she had assisted her father in making observations; and, 1847, Oct. 1, she discovered a comet for which she was awarded the prize of a gold medal by the king of Denmark. She made observations for the U. S. Coast Survey and compilations for the *Nautical Almanac.* During a tour in Europe, 1858, she visited the principal observatories and was an honored guest of the leading scientists. Upon her return she was presented with a fine telescope by the women of America. In 1865, she became director of the observatory and professor of astronomy at Vassar College. Early in 1888 she resigned, on account of ill health and advancing years. Her resignation was not accepted, but she was made professor emeritus. She was a member of the American Association for the Advancement of Science, and was given the degree of ll.d. by Hanover in 1852 and by Columbia in 1887. She was a believer in woman's suffrage, but not active in the suffragist movement; she was, however, a member, and for several years president, of the American Association for the Advancement of Women.

MITCH'ELL, Peter: b. Newcastle, New Brunswick, 1824, Jan. 4; d. Montreal, 1899, Oct. 25. He was educated in his native town, and, 1848, was admitted to the bar, but soon became interested in ship-building and politics. He was chosen, 1856, representative to the pro-

vincial parliament, and after five years of service in that capacity was made life member of the legislative council. He was prominent in the movement for confederation of the provinces of Brit. America and for construction of the Intercolonial railroad, and was repeatedly chosen delegate to Canada and England in behalf of these projects. He served in the senate several years, but resigned 1872, and was minister of marine and fisheries under the Macdonald administration. He was elected representative, 1882, from his native county to the Dominion parliament, was one of the chief promoters of the Canada Pacific railway, and for several years was president of the company publishing the Montreal *Herald.*

MITCHELL, Samuel Augustus: American geographer: b. Bristol, Conn., 1792, Mar. 30; d. Philadelphia, 1868, Dec. 20. His early life was devoted to teaching, in which he was very successful, but the inadequate treatment of geography by the text-books then in use induced him to turn his attention to the making of satisfactory ones and he spent 40 years in Philadelphia in the preparation of his text-books on that subject. So general was their adoption that they reached a sale of 400,000 annually. Besides his geographical text-books, of which there were 24, he edited a new edition of John James Audubon's *Birds of America,* and wrote: *General View of the World, Physical, Political, and Statistical* (1846), and *New Traveller's Guide through the United States* (1850).

MITCHELL, Silas Weir, m.d., ll.d.: American physician, poet, and novelist: b. Philadelphia, 1829, Feb. 15. He studied at the University of Pennsylvania, was graduated from Jefferson Medical College in 1850, entered practice in Philadelphia, during the civil war was in charge of the Turner's Lane United States hospital (Philadelphia) for diseases and injuries of the nervous system, and subsequently was president of the Philadelphia College of Physicians. In his professional capacity he became known for his researches in connection with nervous diseases, and in physiology and toxicology. A bibliography of his publications would supply the titles of some 150 medical papers, recounting investigations of high scientific importance. To a wider degree, however, he is known through his literary work, composed principally of poetry and fiction. He was elected to the American Academy of Arts and Sciences and the National Academy of Sciences, and was also made associate, corresponding, or honorary member of foreign scientific societies. His works in medical science include: *Researches on the Venom of the Rattlesnake* (1860); *Gunshot Wounds and Other Injuries of Nerves; Reflex Paralysis* (1864); *On Injuries of the Nerves and Their Consequences* (1872); and *Fat and Blood, and How to Make Them* (1877). Among his other writings are, in verse, *The Hill of Stones* (1882); *A Masque* (1887);

The Psalm of Death (1890), and *The Wager* (1900); in fiction, *Roland Blake* (1884); *Far in the Forest* (1888); *A Madeira Party* (1895); *Hugh Wynne* (1897); *The Adventures of François* (1899); *The Autobiography of a Quack* (1900); *Circumstance* (1901); *Collected Poems* (1896); *Memoir of Owen Jones* (1896); *Constance Trescot* (1905); etc.

MITCHELL, WALTER, A.M.: American Protestant Episcopal clergyman: b. Nantucket, Mass., 1826, Jan. 22. He was graduated from Harvard in 1846 and admitted to the bar in 1849, but deciding to enter the Episcopal ministry, received ordination to the priesthood in 1860. He held many important charges and was for a time chaplain of Kenyon College, Gambier, Ohio, and has now retired from active service. He has published: *Two Strings to His Bow; Bryan Maurice;* etc.

MITCHELL, WILLIAM: American astronomer: b. Nantucket, Mass., 1791, Dec. 20; d. Poughkeepsie, N. Y., 1868, Apr. 19. He taught for a time, became cashier of the Pacific bank in Nantucket, and made a long series of investigations in connection with the United States coast survey studies of the figure of the earth. Besides lecturing on astronomy in Boston and elsewhere, he contributed to the *American Journal of Science,* and supplied time to whaling vessels. He was elected to the American Academy of Arts and Sciences.

MITCHILL, SAMUEL LATHAM: American physician: b. North Hempstead, L. I., 1764, Aug. 20; d. New York 1831, Sep. 7. He was graduated M.D. at the University of Edinburgh in 1786, and in 1788 was a commissioner for treating with the Iroquois Indians for the purchase of land. In 1792 he was appointed professor of chemistry, natural history, and philosophy in Columbia College, where he first introduced the system of nomenclature invented by Lavoisier. In 1797 he founded with Dr. Edward Miller and Elihu H. Smith the quarterly *Medical Repository,* of which he continued the editor for 16 years. It was the first scientific periodical published in the United States. In 1801 he became a representative in congress, and in 1804 was chosen to the United States senate. At the expiration of his term of office he was again elected to the house of representatives. On the establishment of the college of physicians and surgeons he was appointed (1808) professor of natural history, becoming in 1820 professor of botany and materia medica. The institution in 1826 gave place to the Rutgers Medical School, of which Dr. Mitchill became vice-president. Though widely respected in his lifetime as a man of extraordinary learning, he was occasionally the victim of the satirical wits of New York, and the poems of 'Croaker & Co.,' to which Fitz-Greene Halleck was a contributor, contain records of some of his eccentricities. He proposed to change the name of this country to 'Fredonia,' and wrote in 1804 'An Address to the Fredes, or

People of the United States.' He was one of the early supporters of Robert Fulton, whom he accompanied in 1807 in the first steamboat journey on the Hudson. He was the author of *Observations on the Absorbent Tubes of Animal Bodies* (1787); *Nomenclature of the New Chemistry* (1794); *Life, Exploits, and Precepts of Tammany, the Famous Indian Chief*, a half historical, half fanciful address before the Tammany Society of New York (1795); etc. Consult: Francis, *Reminiscences of Samuel Latham Mitchill* (1859).

MITE, n. *mīt* [OF. *mite*, the smallest of coins—from O.Dut. *mijte*, small: Dut. *mijt*, a very small coin: OE. *mynutis*, a very small coin: Port. *miudo*, little (see MINUTE 1)]: in *Scrip.*, a small coin, equal to about one-third of a farthing (about one-sixth of a cent): the OE. mite was of about the same value; a very little thing; a minute particle.

MITE, n. *mīt* [Dut. *mijte;* Sp. *mita;* F. *mite*, a mite: prov. Sw. *smit;* Gael. *smiot*, a particle: Gr. *midas*, a little creature that eats beans]: small insect not easily seen by the naked eye, found in cheese and many other substances. MITY, a. *mī'tĭ*, containing mites.—*Mite* is a name given to the *Acarides* generally (see ACARUS); sometimes only to those of them which have the feet formed for walking, and the mouth furnished, not with a sucker formed of lancet-like plates, as in the Ticks (q.v.), but with mandibles. All are small creatures; the species are very numerous; they feed chiefly on decaying animal and vegetable substances, or are parasitical on quadrupeds, birds, and insects. The CHEESE MITE (*Acarus domesticus*) is one of the best known species; another is the FLOUR MITE (*A. farinæ*), too common among flour, in both of which the body is covered with hairs very large in proportion to its size, and capable of a considerable amount of motion. The SUGAR MITE (*A. saccharinus*) swarms in almost all *soft* sugar; but refined and crystallized sugar seems to defy its mandibles, and is free of it. The surface of jelly and preserves, when it has begun to become dry, is often covered with multitudes of very small mites. A species of mite is the cause of Itch (q.v.); and many of the lower animals are infested by parasites of this tribe. Beetles may often be seen absolutely loaded by a species which preys on them; and bird-fanciers regard with the utmost horror the RED MITE, which lurks in crevices of cages and aviaries, and sucks the blood, and eats the feathers of their inmates.

MI'TER. See MITRE.

MITFORD, *mĭt'ford*, MARY RUSSELL: English authoress: 1786, Dec. 16—1855, Jan. 10; b. Alresford, Hants; only child of a physician. At the age of ten, she was sent to a boarding-school at Chelsea, and also placed under the guidance and tuition of Miss Rowden, a lady of literary turn, who had educated Lady Caroline Lamb, and was afterward instructress of Miss Landon and of Fanny

Kemble. During the five years that she spent at Chelsea, she read with avidity, studying the tragic authors of France, Shakespeare, and the early dramatists of England. At the age of 15, she returned home, and before she was 20, she published three vols. of poetry. These having been severely castigated by the *Quarterly Review*, she applied herself to writing tales and sketches for the magazines. The profession which she had adopted from taste she continued from necessity; for her father, an idle and spendthrift gentleman, had exhausted a fortune of £20,000 drawn as a lottery prize, which left him dependent on his daughter, who exercised over him a motherly care, and indulged him in the exactions which were natural to his easy good-nature. The first vol. of *Our Village* appeared 1824, and the five vols. completed 1832. Of the more important of her dramatic works, *Julian* was performed first 1823; *Foscari* 1826; and *Rienzi* 1828—all, especially the last, with success. Among her other important works, are *Recollections of a Literary Life* (3 vols. 1852); *Atherton* (a novel, 3 vols. 1854) *and other Tales.* Miss M. published a collected ed. of her dramatic works, 2 vols. 1854. In 1838, she received a pension from govt., but neither this, nor the growing ill-health of her later years, induced her to relax her literary industry. She died at her residence, Swallowfield Cottage, near Reading. Successful both as compiler and as author, Miss M. produced many interesting volumes; but her fame—if the admiring respect for an amiable lady and a woman of graceful literary genius may be so called—rests chiefly on the sketches of country life which compose *Our Village.* These sketches are memorable chiefly for their style, which is unaffected, spontaneous, vivacious, genial, and humorous, revealing a charming character. Five vols. of her Life and Letters appeared 1870–72; and two vols. of Letters to her, 1882.

MITFORD, William: 1744, Feb. 10—1827, Feb. 8; b. London. He studied at Queen's College, Oxford, but left the univ. without taking his degree. In 1761, he succeeded to the family estate; and 1769 became a capt. in the South Hampshire militia. M.'s first work, *An Inquiry into the Principles of Harmony in Languages, and of the Mechanism of Verse, Modern and Ancient*, appeared 1774; but by far his most important publication was his *History of Greece*, the first vol. of which appeared 1784, and the last 1818; a pugnacious, opinionated, and even fanatical production. The author is an intense hater of democracy, and can see in Philip of Macedon nothing but a great statesman, and in Demosthenes, nothing but an oratorical demagogue. Yet his zeal led him for substantiating his views, to search minutely and critically certain unexplored portions of Greek history; this gave M.'s work a high place in the opinion of scholars until the appearance of Thirlwall and Grote.

MITHRADATES.

MITHRADATES, *mĭth-ra-dā'tēz*, improperly, MITHRIDATES [from Persian *Mithras* (q.v.) or *Mithra*, 'the sun,' and an Aryan root *da*, to give; hence 'sun-given' or 'sun-born']: name of several kings of Pontus, Armenia, Commagene, Parthia, and the Bosporus; all of whom have sunk into insignificance, with the exception of Mithradates VI. of Pontus, surnamed EUPATOR and DIONYSUS, but more generally known as M. THE GREAT: prob. abt. B.C. 132–63 (reigned about B.C. 120–63). Little is known of his early career. He succeeded his father before 13 years of age, and soon subdued the tribes who bordered on the Euxine, as far as the Chersonesus Taurica (Crimea); and after the death of Parysatis, incorporated the kingdom of the Bosporus with his dominions. The jealous behavior of the Romans and the promptings of his own ambitious spirit incited him to invade Cappadocia and Bithynia, but a wholesome fear of the power of the Great Republic induced him to restore his conquests. The *First Mithridatic War* was commenced by the king of Bithynia B.C. 88, who, at the instigation of the Romans, invaded Pontus. M. sent an ambassador to Rome to complain of this treatment, but he was sent back with an evasive reply. M. immediately began hostilities, and his generals repeatedly defeated the Asiatic levies of the Romans, and he himself took possession of Bithynia, Cappadocia, Phrygia, and the Roman possessions in Asia Minor, the inhabitants of which last hailed him as deliverer. By his orders, a great massacre of the Romans took place, in which, according to one account, 80,000, according to another 150,000 were slain. He also sent three powerful armies to aid the Greeks in their rebellion, but the disastrous battles of Chæronea and Orchomenus broke his power in that country. He was driven from Pergamus B.C. 85 by Flavius Fimbria, and reduced to the necessity of making peace with Sulla, relinquishing all his conquests in Asia, giving up 70 war-galleys to the Romans, and paying 2,000 talents. The wanton aggressions of Murena, Roman legate, gave rise to the *Second Mithridatic War*, B.C. 83. M. was wholly successful in this war, but peace was concluded on the *status quo*, B.C. 81. M. felt, however, that this was merely a truce, and lost no time in preparing for a third contest, in alliance with Tigranes, King of Armenia, the next most powerful monarch of W. Asia. Tigranes seized Cappadocia B.C. 76, and M., in the following year, invaded Bithynia, commencing the *Third Mithridatic War*. M. formed an alliance with Sertorius (q.v.), and obtained the services of Roman officers of the Marian party, who trained his army after the Roman manner. The arms of M. were at first successful; but afterward the Roman consul Lucullus (q.v.) compelled him to take refuge with Tigranes, B.C. 72. Lucullus then conquered Pontus, defeated Tigranes, B.C. 69, at Tigranocerta, and both Tigranes and M. at Artaxata, B.C. 68. M., however, recovered possession of Pontus. After the war had

lingered some time, Cneius Pompeius (see POMPEY), completed the work of Lucullus, defeating M. on the Euphrates B.C. 66, and compelling him to flee to the Bosporus. Here his indomitable spirit prompted him to a new scheme of vengeance, but it was frustrated by the rebellion of his son, Pharnaces, who beseiged him in Panticapaœum. Deeming his cause hopeless, M. put an end to his own life. M. was a specimen of the true eastern despot; he had the ability that is given by irresponsible power, unbounded ambition, and merciless hate of foes, and that manifests itself in courage, extraordinary energy, and perseverance. His treachery and cruelty were frightful; he murdered his mother, his sons, his sister, who was also his wife, his concubines, and his most intimate friends. Superstition became to him a science; he was a great student of magic, and the accounts of him which pass for history read like extracts from the *Arabian Nights*. His physical stature and strength were wonderful. His want of success was owing not altogether to his defects as a general, but largely to the impossibility of raising and training an army of Asiatics capable of coping with the Roman legions; and his system of tactics during the third Mithridatic war plainly shows his conviction of this fact. He had received a Greek education with its outward polish at Sinope, could speak 22 different languages and dialects, and possessed considerable love for the arts, of which his magnificent collections of pictures, statues, and engraved gems were a proof. In the estimation of the Romans, he was the most formidable opponent they ever encountered, and occasional reports of his successes spread terror among them.

MITHRAS, *mĭth'ras* (cf. Sanskrit *Mitram*, friend): highest of the 28 second-class divinities of the anc. Persian Pantheon, the *Ized* (Zend. *Yazata*) or genius of the bright heaven or the day, and ruler of the universe. Later, M. became quite identified with the sun as a god. Protector and supporter of man in this life, he was believed to watch over his soul in the next, defending it against the impure spirits, and transferring it into the realms of eternal bliss. In the Persian mythology, he is all-seeing and all-hearing, and, armed with a club—his weapon against Ahriman and the evil *Dews*—he unceasingly 'runs his course' between heaven and earth. The ancient monuments represent him as a beautiful youth, in Phrygian garb, kneeling on an ox, into whose neck he plunges a knife; several minor, varying, allegorical emblems of the sun and his course, surrounding the group. At times, he is represented as a lion, or the head of a lion. The most important of his many festivals was his birthday, celebrated Dec. 25. The worship of M. early found its way into Rome; it was regularly established by Trajan about A.D. 100, and the mysteries of M. (*Hierocoracica*, *Coracica Sacra*), which fell in the spring equinox, were famous even among the many Roman festivals. The ceremonies observed in the initiation

to these mysteries—symbolical of the struggle between Ahriman and Ormuzd (the Good and the Evil)—were extraordinary and even dangerous. Baptism and the partaking of a mystical liquid, consisting of flour and water, to be drunk with the utterance of sacred formulas, were among the inaugurative acts. The seven degrees—according to the number of the planets—were, 1. Soldiers: 2. Lions (in the case of men), or Hyenas (in that of women): 3. Ravens: 4. Degree of *Perses:* 5. of *Oromios:* 6. of *Helios:* 7. of Fathers—the highest—called also Eagles and Hawks. At first, it was a merry worship—thus the king of Persia was allowed to become drunk only on the Feast of the Mysteries; but the solemnities gradually assumed a rigorous aspect. From Persia, the cultus of M. and the mysteries were imported into Asia Minor, Syria, Palestine, etc., and it is probable that in some parts human sacrifices were connected with it. Through Rome, where this worship, after many vain endeavors, was finally suppressed A.D. 378, it may be presumed that it found its way into w. and n. Europe; and many tokens of its former existence, e.g., in Germany, are still found, such as the M. monuments at Hedernheim, near Frankfurt-on-the-Maine, and at other places. Among chief authorities on this subject are Anquetil du Perron, Creuzer, Silvestre de Sacy, Lajard, O. Müller (*Denkmäler d. alten Kunst*). See GUEBRES: PARSEES: ZENDAVESTA.

MITIGATE, v. *mĭt′ĭ-gāt* [L. *mitigatus*, softened, allayed or eased—from *mitis*, soft, mild: It. *mitigare:* F. *mitiger*]: to alleviate or ease, as sufferings; to reduce or lessen, as a penalty or a disease; to soften: to appease; to soothe. MIT′IGATING, imp.: ADJ. alleviating; moderating. MIT′IGATED, pp.: ADJ. alleviated; moderated. MITIGANT, a. *mĭt′ĭ-gănt*, softening; diminishing or easing, as pain: N. that which eases or lessens. MIT′IGATOR, n. *-gā-tẽr*, one who or that which mitigates. MITIGABLE, a. *mĭt′ĭ-gă-bl*, that may be alleviated or lessened. MIT′IGA′TION, n. *-gā′shŭn* [F.—L.]: the act of mitigating; the diminution or lessening of anything painful, severe, or calamitous. MIT′IGATIVE, a. *-gā-tĭv*, tending to lessen or alleviate.—SYN. of 'mitigate': to allay; alleviate; pacify; relieve; assuage; calm; abate; cool.

MITRAILLEUSE, n. *mĭt′rāl-yėz′*, MIT′RAILLEUS′ES, n. plu. *-yāz′ĕz* [F.—from *mitraille*, case or grape shot: *mitrailler*, to fire with grape or case shot]: a many-barrelled gun, having the barrels laid together like a fagot of sticks, and securely attached to each other, loaded with great quickness by an apparatus at the breech, and discharged each barrel singly, or the whole nearly simultaneously: see REVOLVER: GATLING GUN. Also sometimes used, MITRAILLEUR, n. *mĭt′rāl-yār′*. MITRAILLE, n. *mĭt-rāl′*, grape-shot.

MITRAL, a. *mī′trăl* [L. and Gr. *mitra*, a head-dress, a mitre]: having the form of a mitre; in *anat.*, applied to a valve attached to the circumference of the left auriculo-ventricular orifice, whose flaps are supposed to resemble the segment of a bishop's mitre; the bicuspid valve.

MITRE, n. *mī′tėr* [F. *mitre*, an episcopal crown—from L. and Gr. *mitra*, a headband, a turban: It. *mitra*]: in *R. Cath. Ch.*, a sort of crown worn on solemn occasions by archbishops, bishops, and sometimes by abbots; episcopal dignity; the junction of objects, e.g., the point or line of union of moldings meeting at an angle usually of 45°: V. to adorn with a mitre; to unite at an angle of 45°. MITRING, imp. *mī′trĭng*. MITRED, pp. *mī′tėrd:* ADJ. wearing or possessing a mitre; episcopal; cut or jointed to meet at an angle. MITRAL, a. *mī′trăl*, mitre-shaped; pertaining to a mitre. MITRE-BOX, a box or trough with vertical cuts through the sides to guide the saw in cutting work to form mitre-joints. MITRE-SQUARE, an immovable bevel for striking an angle of 45°. MITRE-WHEELS, in *mech.*, a pair of bevel-wheels of equal diameter working into each other, usually with their axes at right angles.

MI′TRE: head-dress worn in solemn church services by bishops, abbots, and certain other prelates in the Western Church. The name, as probably the ornament itself, is borrowed from the orientals, though, in its present form, it is not in use in the Greek Church, or in any other of the churches of the various eastern rites. The western M. is a tall, tongue-shaped cap, terminating in a twofold point supposed to symbolize the 'cloven tongues' in the form of which the Holy Spirit was imparted to the apostles (Acts ii. 3), and is furnished with two flaps, which fall behind over the shoulders. Opinion is divided as to the date at which the M. came first into use. Eusebius, Gregory of Nazianzus, Epiphanius, and others speak of an ornamented head-dress, worn in the church; but there is no very early monument or pictorial representation which exhibits any head-covering at all resembling the modern M. From the 9th c., however, it is found in use, though not universally; and instances are recorded in which the popes grant permission to certain bishops to wear the M.; e.g., Leo IV. to Anschar, Bp. of Hamburg, 9th c. The material used in the M. is very various, often consisting of most costly stuffs, studded with gold and precious stones. The color and material differ according to the festival or the service in which the M. is used, and there is a special prayer in the consecration service of bishops, used in investing the new bishop with his mitre. The M. of the pope is of peculiar form, and is called by the name of *Tiara* (q.v.). Although the mitre properly belongs to bishops

Mitre.

only, its use is also permitted by special privilege to certain abbots, to provosts of some distinguished cathedral chapters, and to a few other dignitaries. See Binterim, *Denkwürdigkeiten der Kirche*, 1 B. 2 Th. 348.

The M., as an ornament, seems to have descended in the earliest times from bishop to bishop. Among the Cottonian MSS. is an order, dated July 1, 4 Henry VI., for the delivery to Abp. Chichely of the M. worn by his predecessor. It was in some cases very costly. In England, after the Reformation, the M. was no longer a part of the episcopal costume till 1885, when it was resumed by the new Bp. of Lincoln; but in heraldry it is placed over the shield of an abp. or bp., instead of a crest. The M. of a bp. has its lower rim surrounded with a fillet of gold; but the Abps. of Canterbury and York are in the practice of encircling theirs with a ducal coronet, a usage of late date and doubtful propriety. The Bp. of Durham surrounds his M. with an earl's coronet, in consequence of being titular Count Palatine of Durham, and Earl of Sedburgh. Before the custom was introduced of bishops impaling the insignia of their sees with their family arms, they sometimes differenced their paternal coat by the addition of a M. Mitres are rare as a charge in heraldry, but are sometimes borne as a crest, particularly in Germany, to indicate that the bearers were feudatories, or dependencies of ancient abbeys.

MI′TRE SHELL: name for the shells of several species of *Mitra*, genus of gasteropods belonging to the family *Volutidæ*. These shells are of great beauty, especially that known as the bishop's mitre shell. The shell of *Mitra* is fusiform, thick, spire elevated, acute; aperture small, notched in front; columella obliquely plaited; operculum very small. The animal has a long proboscis; and, when irritated, emits a purple liquid having a very offensive smell. The eyes are situated on the tentacles or at their base. Over 100 fossil and 400 recent species have been described. In the bishop's (*M. episcopalis*), the animal has a narrow foot, compressed at its root, nearly square and slightly articulated in front with a margined furrow, and pointed behind; eyes sessile at the base of the tentacles; the proboscis twice the length of the shell. The shell is turreted, smooth, white, spotted with bright red; pillar four plaited; outer lip denticulated at its lower part; epidermis thin. It is found in E. Indian seas and islands of the S. Sea. The different species are found at depths varying from the surface to 17 fathoms, on reefs, sandy mud, and sands. They all are inhabitants of warm countries.

MITRIFORM, a. *mī′trĭ-fawrm* [L. *mitra*, a headband; *forma*, shape]: in *bot.*, shaped like a mitre; conical; hollow and open at the base.

MITSCHERLICH, *mĭt'shĕr-lĭch*, EILHARDT: Prussian chemist: 1794, Jan. 7—1863, Aug. 28; b. Neuende, near Jena. At the Univ. of Heidelberg he studied history, philology, and oriental languages; and later at Paris and Göttingen. At Göttingen (1814 or 15) he seems first to have turned his attention to geology and mineralogy, chemistry and physics; and at Berlin, 1818, he selected chemistry as his special study. His observations on the striking similarity between the crystalline form and the chemical composition of the arseniates and the phosphates, led to his discovery of the law of Isomorphism (q.v.), the importance of which was so fully recognized by Berzelius, that he invited the young chemist, 1819, to Stockholm, where he studied till 1821, when, on the death of Klaproth, he was, on recommendation of Berzelius, appointed to the vacant chair of chemistry at Berlin. One of his earliest discoveries after his appointment was that of the double crystalline form of sulphur, the first observed case of Dimorphism: see DIMORPHISM. His investigations regarding the formation of artificial minerals, and his memoirs on Benzine and on the Formation of Ether are among his most important contributions to chemistry; but mainly on the discovery of Isomorphism and Dimorphism his reputation will finally rest. His principal work is *Lehrbuch der Chemie*, begun 1829, concluded 1841. It has passed through five editions, and is especially valuable for the clear and simple way in which he has brought mathematics and physics to bear upon the subject. He was an honorary member of almost all the great scientific societies, and received the gold medal from the Royal Soc. of London for his discovery of the law of Isomorphism. He died at Berlin.

MITTAU, *mĭt'tow*, or MITAU, *mē'tow:* chief town of the govt. of Courland, European Russia; on the right bank of the Aa, 25 m. s.w. of Riga; founded 1271 by the grand master of the Teutonic Knights. It was annexed to Russia 1795. The majority of the people are Germans by birth or descent, 1,000 are Jews, and only a few Russians. The town is indifferently built, the houses being chiefly of wood, and painted green or brown. The most important buildings are the old castle—now the seat of the gov. of the province—four churches, an astronomical observatory, a public library, a museum, and a number of educational and charitable institutions. As regards commerce and industry, the town occupies only the third place in the govt., its principal product being articles of japanned iron and tin; there is export trade in hemp, flax, and corn. M. is the winter residence of the gentry of the surrounding country, and was for some time the abode of Louis XVIII. Pop. about 25,000.

MITTENS, n. plu. *mĭt'nz* [F. *mitaine*, a winter glove: comp. Gael. *mutan*, a muff, a thick glove; *mutag* and *miotag*, a glove without fingers]: rough coverings for the hands to protect them from the cold; gloves without a separate covering for each finger; gloves without fingers. TO HANDLE WITHOUT MITTENS, to use roughly

MITTIMUS, n. *mĭt′tĭ-mŭs* [L. *mittĭmus*, we send]: in *law*, writ for transfer of records from one court to another; warrant of commitment to prison, given by a magistrate —called usually a commitment: it is addressed to the keeper of the prison, and must describe with reasonable certainty the name (or if that be not known, the person) of the prisoner.

MITTS, n. plu. *mĭts* [contracted from *mittens*, which see]: gloves which do not cover each finger separately, which protect the hand without wholly covering the fingers.

MITTWEIDA, *mĭt′vī-dâ:* town of Saxony, circle of Zwickau, 35 m. s.e. of Leipzig. For centuries, M. has been noted for industry, of which the principal branches are spinning, cotton-weaving, manufacture of fustian, etc., together with dyeworks and bleach-fields. Pop. about 12,000.

MITY: see under MITE 1.

MITYLE′NE, or MYTILE′NE: see LESBOS.

MIVART, ST. GEORGE, PH.D., M.D., F.R.S.: naturalist, teacher, and author; 1827, Nov. 30; 1900, April 1. b. London, Eng. He studied at Clapham and Harrow schools, and at St. Mary's College (Rom. Cath.), Oscott. He was called to the bar 1851, but afterward turned to medical studies, and having taken his degree at St. Mary's, 1862, became prof. of biology in University college, Kensington, 1874; prof. of philosophy of nat. hist. at Louvain, 1890. He was author of numerous works, largely in opposition to certain aspects of Darwinism. Noteworthy are his *Genesis of Species* (1871), *Nature and Thought* (1883), *Origin of Human Reason* (1889), *Types of Animal Life* (1893).

MIX, v. *mĭks* [Ger. *mischen;* Bohem. *misyti;* Gr. *misgein*, to mix: L. *mixtus*, mingled or mixed: Gael. *masg*, to infuse, to mix: W. *mysgu*, to mix]: to mingle or blend two or more substances into one mass; to join or unite, as with a crowd; to associate; to become united or blended; to be joined or associated. MIX′ING, imp. MIXED, pp. *mĭkst:* ADJ. consisting of various kinds; promiscuous; not pure. MIXABLE, a. *mĭks′ă-bl*, that may or can be mixed. MIXER, n. *mĭks′ĕr*, one who or that which mixes. MIX′EDLY, ad. *-ĕd-lĭ.* MIXTURE, n. *mĭks′-tūr* or *-chûr* [L. *mixtūra*, a mingling together]: act of mixing; state of being mixed; a mass or compound formed by mixing two or more substances together; an ingredient added and mixed. In *medicine*, officinal preparations, extempore in their nature, some of which—e.g., *Mistura Camphoræ*, *Mistura Cretæ*, and *Mistura Ferri Composita*—are extensively used in medical practice, either as vehicles for more active remedies, or for their intrinsic value. In *organs*, a compound stop of two to five ranks of small metallic pipes, in tone resembling the sesquialtera, though more shrill.—SYN. of 'mix': to confuse; mingle; confound; associate; compound;—of 'mixture': compound; medley; union; association; admixture; intermixture; composition.

MIXED MARRIAGES: term applied to marriages between persons of differing religions, or of opposing forms of the same religion. In various countries of Europe, such marriages have either been prohibited or put under restrictions. The canon law forbade marriages between Christians and non-Christians; at one time it merely discouraged, at another altogether prohibited, the marriage of orthodox Christians with heretics. Subsequently to the Reformation, papal dispensations were in use to be granted for marriages between Rom. Catholics and Protestants, with the condition annexed that the children should be brought up in the Rom. Cath. faith. During the latter part of the 17th c., parents seem to have been left at liberty to make what agreement they pleased on this head; and in default of their making any, it was presumed that the children would follow the religion of their father. In the middle of the 18th c., the validity of mixed marriages, even when celebrated by the civil magistrate, was recognized by the papal court; and under Napoleon's rule they became common, without stipulations as to the children. The events of 1815 restored sufficient influence to the Rom. Cath. Church, to enable the clergy to put in force a rule by which they could refuse to celebrate such marriages without an assurance that the children would be brought up Rom. Catholics. By the law of many of the German states, the clergyman of the bride was the only person who could competently officiate, and an engagement of this kind was often not only repugnant to the father as a Prot., but illegal. Conflicts followed between the civil and ecclesiastical authorities, which have sometimes been obviated by the priest, on whom the law imposes the celebration of the marriage, not pronouncing the nuptial benediction, but giving his presence as a witness with two other witnesses when the parties declared themselves husband and wife—a kind of marriage whose validity is perfectly recognized by the canon law. In Spain, marriages between Rom. Catholics and Protestants have sometimes taken place in this way, avoiding the stipulations otherwise necessary regarding the children.

There was, till lately, great diversity in the state of the law of mixed marriages in different parts of Germany. Prussia was the first state to do away the former restrictions by the recognition of a civil ceremony alone as that which constitutes marriage in the eye of the law. Until that change, the letter of the law provided that the children should be brought up in the faith of their father, and no compacts to the contrary were allowed. Practically, however, the law was largely evaded, no one having a recognized interest to object to the fulfilment of such agreements. In Bavaria, mixed marriages might be performed either by Prot. or Rom. Cath. clergymen; and the spouses had it in their power to make what arrangements they pleased regarding the children before or after marriage; but if no such ar-

rangements had been made, the children were brought up in the religion of their father. In Saxony, and various other German states, the law was nearly the same. A bill for rendering civil marriage obligatory throughout the empire was brought before the Reichstag 1874, and passed 1875, thus extending the system of Prussia to all other German states. This bill enables men and women to be married independently of the consent of the clergy (not always easily obtained in Rom. Cath. districts), or of the difference of their religious beliefs. It also allows of children being left unbaptized, and brought up without being assigned to any religious denomination whatsoever. In Austria, the interposition of the Rom. Cath. priest is required in marriages between Rom. Catholic and Protestants. He need not, however, give the sacerdotal benediction; his passive assistance only is required, either in taking the declaration of the parties, which is followed by a Prot. ceremony, or by being present as a witness at the Prot. ceremony. When the husband is Rom. Cath., all the children must be brought up Rom. Catholics; when the husband is Prot. and the wife Rom. Cath., the sons follow the father and the daughters the mother. In Denmark, stipulations may be made before or after marriage, and can be altered by mutual consent of the parents, or, in some cases, even after the death of one of them. Mixed marriages were, till lately, altogether prohibited in some of the Rom. Cath. cantons of Switzerland, but they are now authorized in all the cantons by the federal laws: it is generally the clergyman of the husband's creed who officiates, but at Zürich the ceremony is performed in both churches. In most cases, the children are required to be educated in the religion of their father.

In most German states, marriages between Christians and Jews or Mohammedans used to be interdicted; but after 1849, the prohibitions were in individual cases dispensed with. In Denmark, such marriages have been permitted, on condition of the children being brought up Protestants. In Russia, the members of both Greek and Roman communions are prohibited from intermarrying with non-Christians: members of the orthodox Greek Church cannot marry Greek sectaries; but when an orthodox Russian marries a Prot. or Rom. Catholic, the benediction must be given in the Greek Church, and the children baptized in the Greek communion. When the parents are of different religions, but neither belongs to the Greek Church, ante-nuptial stipulations will be given effect; if none have been made, the sons follow the father's faith, the daughters the mother's.

In France, the law regards marriage as a purely civil contract, and recognizes only the civil celebration, which is completely separated from the religious rite. As the faith of the parents is not taken cognizance of, questions regarding the religious education of the children cannot arise before the civil tribunals.

The only restriction to which mixed marriages are now subjected in any part of the United Kingdom is applicable to Ireland only, that a marriage celebrated by a Rom. Cath. priest between a Rom. Catholic and a Protestant, or a person who within 12 months has been or professed to be a Protestant, or between two Protestants, is null.

In the United States, differences in religion are not the subject of legal prohibition or restriction in relation to marriage.

MIXED RACES: subject intimately connected with an enlarged study of ethnology. It involves a consideration of the phenomena attendant on the sexual union between individuals belonging to different varieties of the human race; e.g.—adopting the classification of Blumenbach—between the European and the negro or the American Indian; or between the American Indian and the negro; or between any of these three and individuals belonging to the Malay or Mongolian varieties. It is well understood that such unions are in general prolific; and not only so, but that their offspring is likewise prolific; and this fact is much relied on by some ethnologists, as an argument in favor of the unity of the human race. They reason thus: Were the different varieties of mankind distinct species, as has been frequently alleged, then it would necessarily follow that the offspring of such unions would prove as unfruitful as those between the horse and the ass, the goat and the sheep, the wolf and the dog; and similarly with respect to the hybrids among birds, insects, and plants. To sum up, in the words of Dr. Prichard, best exponent of this school of ethnology: 'It seems to be the well-established result of inquiries into the various tribes of organized beings, that the perpetuation of hybrids, whether of plants or animals, so as to produce new and intermediate tribes, is impossible. Now, unless all these observations are erroneous, or capable of some explanation that has not yet been pointed out, they lead, with the strongest force of analogical reasoning, to the conclusion, that a number of different tribes, such as the various races of men, must either be incapable of intermixing their stock, and thus always fated to remain separate from each other, or, if the contrary should be the fact, that all the races to whom the remark applies, are proved by it to belong to the same species.' Dr. Prichard further observes, that so far from such unions between members of different varieties of the human race proving unfruitful, or their offspring unfruitful, the opposite is the case;—e.g., in unions between the negro and the European, the most strongly marked varieties of our race. 'If we inquire,' he says, 'into the facts which relate to the intermixture of negroes and Europeans, it will be impossible to doubt the tendency of the so-termed Mulattoes to increase. The men of color, or the mixed race between the Creoles, and the negroes, are in many of the W. India Islands a

rapidly increasing people, and it would be very probable that they will eventually become the permanent masters of those islands, were it not for the great numerical superiority of the genuine negroes. In many parts of America they are also very numerous.' It is to America, indeed, both N. and S., that we must chiefly look for the numerous and varied phenomena resulting from this intermixture of races; for there are not only the negro and the European mingling their blood, but the negro and the American Indian, the European and the Indian, and the offspring of each of these with the offspring of the other, or with members of either of the parent stocks; added to which, of late years, the Chinese (of Mongolian race or variety) have appeared upon the scene, thus contributing greatly to the number of what are termed *human hybrids*. All these, however, are not equally fertile; and with respect even to the Mulattoes, it is alleged by writers of the Morton school of ethnology that they do not perpetuate themselves for more than a few generations. 'Nature,' says Squier, rather dogmatically, 'perpetuates no human hybrids—e.g., a permanent race of Mulattoes.' And Dr. Nott, adopting the classification of species laid down by Dr. Morton—namely, *Remote Species*, in which hybrids are never produced; *Allied Species*, which produce, *inter se*, an unfertile offspring; and *Proximate Species*, which produce with each other a fertile offspring—is of opinion that it is only by the union of southern or dark-skinned Europeans with negroes that thoroughly prolific Mulattoes are engendered, which is not the case in unions between individuals of the Anglo-Saxon and negro races. In arriving at this conclusion, we cannot avoid thinking that the author has been helped forward by the strong prejudice in the Southern States against all taint of negro blood. A more impartial writer, Prof. Wilson, in his *Prehistoric Man*, observes: 'There are upwards of four millions of people of African blood in the United States, and certainly not less than ten millions throughout the continent and islands of N. and S. America, and of these the larger proportion consists of hybrids [these figures are much less than the present number]. . . . It is impossible to determine with certainty how far the hybrid colored population of the United States is capable of permanency, either by the development of a fixed hybrid type, or by continuous fertility, until the predominant primary type reasserts its power, by their return to that of the original white or black parent, so long as the mixed breed is constantly augmented in the Southern States by means at variance with the natural and moral relations of social life' [these conditions have largely been changed]. As it is, the weight of evidence appears to be in favor of Dr. Prichard's view; but until the doctrine of hybridity is better undertood, and a more satisfactory answer to the vexed question, 'What is species?' has been supplied to us, we must deem it idle to pronounce dogmatically

on the subject: see HYBRID: SPECIES: MISCEGENATION: also ETHNOLOGY. The following is a ist of half-castes given by Dr. Tschudi, 'with a few additions from other sources,' printed in the appendix to Prof. Wilson's valuable work above mentioned.

Father.	Mother.	Half-caste.
White,	Negro,	Mulatto.
White,	Indian,	Mestizo.
Indian,	Negro,	Chino.
White,	Mulatta,	Cuarteron.
White,	Mestiza,	Creole, only distinguished from the white by a pale brown complexion.
White,	Chinese,	Chino-blanco.
White,	Cuarterona,	Quintero.
White,	Quintera,	White.
Negro, N. A.	Indian,	Zambo or Cariboco.
Negro, S. A.,	Indian,	Mameluco.
Negro,	Mulatta,	Zambo-negro or Cubra.
Negro,	Mestiza,	Mulatto-oscuro.
Negro.	Chinese,	Zambo-Chino.
Negro,	Zamba,	Zambo-negro (perfectly black).
Negro,	Cuarterona,	Mulatto (rather dark).
Negro,	Quinterona,	Pardoc.
Indian,	Mulatta,	Chino-oscuro.
Indian,	Mestiza,	Mestizo-claro (frequently very beautiful).
Indian,	China,	Chino-cholo.
Indian,	Zamba,	Zambo-claro.
Indian,	China-Cholo,	Indian (with short frizzly hair).
Indian,	Cuarterona,	Mestizo (rather brown).
Indian,	Quintera,	Mestizo.
Mulatto,	Zamba,	Zambo.
Mulatto,	Mestiza,	Chino (of rather clear complexion).
Mulatto,	China,	Chino (rather dark).

MIXTECAS, *mēs-tā'kas*, or MIZTECS: one of the Indian nations of Mexico, who came at an early period from the n., took possession of the region now the states of Oajaca, Guerrero, and Puebla, and after the Aztec conquest maintained an independent position in Oajaca. The civilization which they possessed produced fortresses, cities, and temples, of which remarkable remains are still seen; and a literature of primitive character, from which some religious treatises were printed in Mixtecan in the 16th and 17th c. They believed in a heaven, called Sosola, and made use of caves in the mountains as sacred places. They had a progressive industry, and were governed as tribal democracies by independent chiefs. There are 11 reported dialects of the Mixtecan language, which has no *b*, *f*, *p*, or *r*: indicates the plural by *cahite*, 'many,' added to the singular; abounds in personal pronouns; and varies the negative particle with the tense of the verb. The M. are now good citizens of Mexico, abiding secure in their mountain fastnesses.

MIXTILINEAL, a. *mĭks'tĭ-lĭn'ē-ăl*, or MIX'TILIN'EAR, a. *-ē-ēr* [L. *mixtus*, mixed; *linĕă*, a line]: containing or consisting of lines of various kinds, as straight and curved.

MIZZEN, n. *mĭz'n* [F. *misaine,* the foresail of a ship: It. *mezzana,* a triangular sail with a long sloping yard unequally divided, so that a small part at the lower end is before the mast—from *mezzo,* middle]: the aftermost of the sails of a ship: ADJ. hindmost; nearest the stern. MIZZEN MAST, the sternmost of the masts in a three-masted vessel, and also the smallest of the three. Above it, are the mizzen-topmast, the mizzen-top-gallant-mast, and the mizzen-royal. It supports the usual yards, and, in addition, the gaff and boom of the Spanker (q.v.).

MIZZLE, v. *mĭz'l* [Dut. *mist,* fog; *mieselen,* to rain fine: Low Ger. *musseln,* to mizzle]: to rain in very fine drops. MIZZLING, imp. *mĭz'lĭng.* MIZZLED, pp. *mĭz'ld.*

MNEMONICS, n. *nē-mŏn'ĭks* [Gr. *mnemē,* memory; *mnemŏnikos,* belonging to memory]: the art of improving the memory; a system of rules for memorizing. The schemes which are usually suggested are highly artificial and consist of fixing in the mind some arrangement of letters or words with which the terms to be remembered are associated. Psychologists agree that these ingenious methods for memory training are usually too cumbersome to be of any practical service. Mechanical means may profitably be employed, however, for memorizing disconnected lists of words. We find this illustrated in the rhymes for retaining the names of rulers of England, or presidents of the United States. Apart from changes in the general health which affect activity of the nervous system, the only way to improve the general memory according to the psychologist William James, is to improve the methods for increasing attention to the things, for repeating the impression of things, and for thinking the things over in their various relations, logically analyzing and classifying them. In these ways facts may be forced home by emphasizing them, and by building up more associations to aid in their recall.

MNEMOSYNE, *nē-mŏs'i-nē:* in classical mythology, goddess of Memory, and mother of the nine Muses (q.v.), whom she bore to Jupiter. The principal seat of her worship was at Eleutheræ, in Bœotia.

MOA, n. *mō'ă:* New Zealand name of the great wingless or struthious birds (see BREVIPENNES) of which the bones are found imbedded in the sands of the seashore, in swamps, forests, river-beds, and limestone caves. The largest bones belong to the genus *Dinornis* (q.v.), others to *Palapteryx* (q.v); and with them are found bones of a large bird (*Aptornis*), resembling a swan, supposed to be now extinct, also of the existing species of *Apteryx* (q.v.) and of *Notornis* (q.v.), much smaller birds. They are represented by the New Zealanders as stupid, fat, indolent birds, living in forests, mountain fastnesses, etc., and feeding on vegetable food. Their feet are said to have been adapted for digging. They seem to have been extirpated for the sake of their flesh, feathers, and bones.

MOABITES, *mō′ăb-īts:* pastoral people, descendants of Moab, son of Lot; former inhabitants of the mountainous country e. of the lower part of the Jordan and of the Dead Sea—known as the land of Moab, and about 3,000 ft. above the Jordan. By descent and in language the M. were related both to the Israelites and to the Edomites. Their heathenism was of the lowest grade. The national god was Chemosh. Baal-peor also was worshipped; though Jerome declares that the two are merely different conceptions of the same god. Their *cultus* was characterized by extreme licentiousness, and by many abominable rites, among which was human sacrifice (Am. ii. 1; II K iii. 27). In the time of the judges, the Jews were for 18 years under the yoke of the M., who were afterward made tributary by David, but, about B.C. 900, shook off their allegiance to the Jewish kings, and afterward took part with the Chaldeans against the Jews. The M. were a base and sensual people. Their name no longer exists, and the remnants of the people have long been included among the Arabs.

MO′ABITE STONE, THE: slab of black basalt, 3 ft. 8½ inches long, 2 ft. 3½ inches wide, 1 ft. 1·78 inches thick; bearing a long inscription in Hebrew-Phœnician letters; discovered by Mr. Klein of the British Missionary Soc., at Dibân in Moab 1868. It appears to have been erected by Mesha, King of Moab, mentioned in II Kings iii., and the inscription refers to his wars with Israel (B.C. 10th c.). Its date may be taken as about B.C. 890. The negotiations set on foot for its purchase led to quarrels among the Arab tribes claiming an interest in it, and the memorial was unfortunately broken to pieces. The fragments, however, were with great difficulty collected, were rejoined, and are now preserved in the Louvre at Paris. It is an interesting and valuable relic.

MOAN, v. *mōn* [AS. *mœnan*, to moan: Swab. *maunen*, to speak with the mouth nearly shut; *maunzen*, to speak in a whining tone]: to give expression to sorrow or pain in prolonged audible sounds; to lament; to utter moans: N. an audible expression of grief or suffering; a low cry of sorrow. MOAN′ING, imp.: N. the act of one who moans. MOANED, pp. *mōnd*. MOAN′FUL, a. *-fûl*, sorrowful. MOAN′FULLY, ad. *-lĭ*.

MOAT, n. *mōt* [OF. *mothe*, a little earthen fortress; *motte*, a lump of earth, a clod; *mote*, a dike: It. *mota*, a moat about a house: mid. L. *mota*, a hill or mound on which a fort was built]: a ditch or deep trench around a castle or around the ramparts of a fortress, sometimes filled with water: a *dry* moat should have a depth not less than 12 ft., and a width not less than 24. The more perpendicular the walls, so much the greater the obstruction to the enemy. In regular works, the walls are usually revêted with masonry; that at the foot of the rampart being the scarp or escarp, and that below the covered way the counterscarp (see DITCH: FORTIFICATION): V. to surround with a ditch for defense. MOAT′ING, imp

MOAT'ED, pp.: ADJ. surrounded or fortified by a moat. *Note.*—MOAT meant originally a sod or turf, such as may be dug out, and used to form a mound, and hence in OE., 'an earthen wall to defend a house or place,' and then 'the trench so formed by digging': Bav. *mott*, peat dug for fuel: It. *mota*, mire; *motta*, a heap of earth, also a hollow: Sp. *mota*, a mound—see Skeat.

MOB, n. *mŏb* [L. *mobĭlĕ*, easily moved, variable, as in L. *mobĭlĕ vulgus*, the fickle common people: comp. Gael. *mop* or *mob*, disorder, confusion; *mobainn*, to handle roughly]: a crowd or multitude of people rude and disorderly; a crowd; the populace: V. to attack in a disorderly crowd; to harass or overbear tumultuously. MOB'BING, imp. MOBBED, pp. *mŏbd.* MOBBISH, a. *mŏb'bĭsh.* done after the manner of a mob. MOB-LAW, a rough and off-hand way of administering justice undertaken by a mob.—SYN. of 'mob, n.': assemblage; assembly; multitude; throng; swarm.

MOB-CAP, n. *mŏb-kăp'* [OE. *mobble*, to muffle up; O. Dut. *moppen*, to wrap up; *mop*, a woman's coif: Low Ger. *mopp*, a woman's cap]: a kind of female undress for the head, having a full round crown gathered into a band at the outer edge, usually made of clear muslin; a woman's night-cap.

MOBERLY, *mō'bĕr-lĭ:* city, Randolph co., Mo.; a railroad and manufacturing centre, 23 m. s. of Macon, 148 m. w. of St. Louis. It has 11 churches, a high school, one daily and two weekly newspapers, and two banks. Its manufactures include flour, tobacco, carriages, and various implements. There is also a planing mill, and a foundry; the shops of the Wabash Western r.r. are here, and there are machine shops for repair work of different kinds. Pop. (1900) 8,012; (1910) 10,923.

MOBILE, a. *mō'bĭl* [F. *mobile*, movable—from L. *mobĭlĕ*, easily moved, variable]: susceptible of motion; movable; fluid. In military affairs, especially in continental Europe, applied to an army in readiness to take the field (see MOBILIZE). MOBILITY, n. *mō-bĭl'ĭ-tĭ*, capacity of being moved; fluidity; fickleness; the lower stratum or mob.

MOBILE, *mō-bēl':* city, cap. of Mobile co., Ala., port of entry, and most important railroad and commercial centre in the state. It is on the M. river, near its union with the M. bay, 30 m. n. of Gulf of Mexico, 140 m. e. of New Orleans, 1,033 m. from Washington. It is about six m. long and extends two to three m. w. from the river, but the closely settled portion occupies only about one sq m bordering on the river. M. is on a sandy plain about 15 ft. higher than the river. Its wide and shaded streets are regularly laid out, lighted with gas and electricity, and many of them are well paved. An abundant supply of pure water is obtained from Spring Hill, five m. away, the works for which cost half a million dollars. S. and w. of the city are hills covered with pines which

are popular resorts in the hot season, and upon which many beautiful summer residences have been erected. With the exception of occasional visits of yellow fever, which sanitary precautions are making less frequent, the location is healthful. M. is an important railroad centre; three trunk lines leading to the great cities of the s. and w., two local lines, and the M., Jackson and Kansas City railroad furnish means of communication. The great coal fields and iron mines in the central part of the state also are reached by railroad, and there are steamer connections with Montgomery, the large seaboard cities and Liverpool. On account of the shallowness of the harbor large vessels were formerly compelled to remain in the bay about 25 m. from the wharves. The national govt. appropriated $250,000 to deepen the channel, and ships drawing 22 or 23 ft. of water are able to enter the harbor. New wharves were built at cost of $240,000. M. is the natural shipping point of the largest cotton-growing section in the Union, and the outlet of 2,000 m. of navigable rivers which drain a rich agricultural, iron, and coal region. In 1902-3 the total exports and imports were valued at $16,790,000. The annual timber shipments, foreign and coastwise, are about 30,000,000 ft., besides 150,000 to 200,000 pieces of white oak for wine barrel staves and 130,000,000 cypress shingles. Of the import trade coffee is the most important item. M. which, after the civil war until about 1880, had a season of depression and decline in population and trade, is now more than renewing its former prosperity. The manufacturing interests are increasing rapidly. They include cotton-mills, foundries, sash and door works, box and barrel shops, paper-mills, shingle mills, etc. Market-gardening is an important interest. M. has numerous churches, 4 orphan asylums, U. S. marine hospital; excellent schools, including a high school for colored children; academies, Jesuit college, state medical college; and 1902, Sept., 6 banks, including 2 national, capital $500,000; 2 state, capital $240,000; 2 private banking concerns, and several fire insurance companies. There are 6 lines of street cars, and several newspapers. Among the fine buildings are the custom-house, in which the post-office is located; Rom. Cath. cathedral, Christ Church (Prot. Epise.), Odd-Fellows' hall, and the Battle House. M. was founded 1702 and was the cap. of La. till 1723, ceded to Great Britain 1763, captured by the Spanish 1780, retaken for La. 1813, and was incorporated a city 1819, with pop. 2,500. It was the scene of important military and naval operations in the civil war. Pop. (1900) 38,469; (1910) 51,521.

MOBILE BAY, Battle of, a battle of the Civil War, fought 1864, Aug. 5. The Union fleet lost 52 killed, 170 wounded, and 113 drowned in the Tecumseh; the Confederates 10 killed, 16 wounded, and 280 prisoners, besides the casualties in the fort. Both forts surrendered. The Union fleet carried 159 guns, and the officers and crews numbered 3,000 men. The Confederate fleet carried 22 guns and 470 officers and men.

MOBILE′ Point: end of a long narrow sand-strip in s.w. Ala. which separates Mobile Bay from the Gulf of Mexico on the s.: the Point is the e. extremity of the entrance to Mobile Bay, and is the site of Fort Morgan (q.v.). Fort Bowyer, a previous rude construction on the same site, was attacked by a British squadron of four vessels 1814, Sep. Its garrison of 130 men under Maj. Lawrence held the fort with a loss of 8 men: the British loss was 232 killed and wounded, and their flag-ship, which grounded and was burned. 1815, Feb., Fort Bowyer was captured by the British.

MOBILE′ River and Bay: river, and its estuary in s.w. Ala., discharging into the Gulf of Mexico.—The *River* is formed by the confluence of the Alabama and Tombigbee, 50 m. above Mobile, which lies at its mouth. It is a sluggish stream, with low banks and several channels. Six m. below the junction of the two rivers which form it, it divides into an e. branch (the Tensas river) and a w. branch (M. river). The M. is navigable for large steamboats throughout.—The *Bay* is 30 m. n. to s., and 10 or 12 m. e. to w. The entrance from the Gulf of Mexico, 3 m. wide, is defended by Fort Morgan and Fort Gaines.—M. Bay is a shallow sheet of water, 12 to 14 ft. deep. At its s.w. extremity is an outlet communicating with Mississippi Sound through Grant's Pass, giving inland navigation for light-draught steamers through Lake Ponchartrain to New Orleans. A plan for dredging a channel 23 ft. deep through the bay from the city of Mobile to the Gulf is now being carried out. Many small rivers empty into the bay from the n., and its margins are lined with thick groves of live oak and magnolia.

MOBILIER, Crédit, *krā-dē′ mō-bē-lyā′:* notable banking institution in France, sanctioned by the French government 1852, Nov. 18, under the name *Société Général de Crédit Mobilier.* The name was intended as a contrast to the *Sociétés de Crédit Foncier*, which are of the nature of land banks, and advance money on the security of real or *immovable* property; while the *Crédit Mobilier* proposed to give similar aid to the owners of *movable* property. The declared object of this bank is especially to promote industrial enterprises of all kinds, such as the construction of railways, sinking of mines, etc. Various privileges were conferred on it under its charter; in especial, it was allowed to acquire shares in public companies, and to pay the calls made upon it in respect of such shares, by its own notes or obligations; also to sell or give in security all shares thus acquired. The operations of the society were on a very extensive scale. In 1854, it subscribed largely to the govt. loan on account of the Russian war, to the Grand Central Railway Company, to the General Omnibus Company of Paris, and to various other important undertakings. The dividend for that year was 12 per cent. In 1855, it lent two sums to the govt.—one of 250, the other of 375 million francs. Its operations were vast during that

year, and the dividends declared amounted to 40 per cent. The directors had not hitherto availed themselves of their privilege of issuing their own obligations, but this they now resolved on doing. They proposed to issue two kinds—one at short dates; the other at long dates, and redeemable by instalments. The proposed issue was to amount to 240 millions of francs, but the public became alarmed at the prospect of so vast an issue of paper-money, so that, 1856, Mar., the French govt. deemed it necessary to prohibit the carrying out of the proposed scheme. This was a severe blow to the institution. In 1856, its dividends did not exceed 22 per cent.; in 1857, they were only 5 per cent. Several attempts had been made to resuscitate its credit, but failed. In 1875 it was put under a new board of management, who reported its assets at 77,000,000 francs. In 1878, the capital was reduced from 80 millions to 32, and in 1879, raised again to 40 millions. In 1872–79, the highest value reached by the shares was 390 francs (in 1874). The C. M. has undoubtedly been highly useful in the industrial development of France; but its operations have been hazardous, and except for the timely governmental check would probably have been disastrous.

MOBILIER′, Credit′ (of America): see Credit Mobilier of America.

MOBILIZE, v. *mŏb′ĭl-īz* [F. *mobiliser*, to make movable —from L. *mobĭlis*, easily moved]: to call into active service, said of troops not previously on the war establishment. Mob′ilizing, imp. Mobilized, pp. *mŏb′ĭl-īzd*. Mobilization, n. *mŏb′ĭl-ĭ-zā′shŭn* [F.—L.]: the calling out and putting into a state of readiness for active service in the field troops not previously on the war establishment. The process consists in augmenting regiments from the peace to the war complement, in calling in men on furlough, in organizing the staff of divisions and brigades, constituting the commissariat, medical, artillery, and transport services, and in accumulating provisions and munitions. As the work of mobilizing an army causes enormous expense, it is resorted to only when hostilities appear imminent.

MOBLE, or Mobble, v. *mŏb′l* [Dut. *moppen*, to wrap up (see Mob-cap)]: in *OE.*, to wrap up as in a hood. Mob′ling, imp. Mobled, pp. *mŏb′ld*.

MOBOCRACY, n. *mŏb-ŏk′ră-sĭ* [Eng. *mob*, and Gr. *kratĕō*, I rule]: the rule or ascendancy of the mob.

MOCCASIN, n. *mŏk′ă-sĭn* [Indian word]: a shoe or cover for the feet made of deerskin, but without a sole; the shoe worn by the American Indians. In the southern United States, an exceedingly poisonous water-serpent, called sometimes Water-moccasin (spelled also *Mocassin*), or Cotton-mouth (*Ancistrodon piscivorus*); about two ft. long; dark brown above, gray below. It frequents swamps and is prompt in attack.

MO'CHA: seaport, former cap. of Yemen, in Arabia; on the Red Sea, at the head of a little bay near the Strait of Bab-el-Mandeb, 130 m. w.n.w. of Aden (q.v.). All round the shore is a hot sandy waste. The principal trade is in coffee; but the eminence of M. as the shipping port for all the coffee of Yemen (M. not being itself in the coffee-growing country), has now been transferred to Aden. Other exports are dates, gums, balm, ivory, and senna. Pop. 5,000.

MOCHA, n. *mō'kă* [from *Mocha*, in Arabia]: a fine description of coffee. MOCHA-STONE, a white translucent variety of agate, containing brown markings resembling finely ramified vegetable filaments or mosses—named from the fact that when they first became known in Europe, they were brought from Mocha. Of the same nature with Mocha-stones are *Moss Agates*. The resemblance of the inclosed infiltrations to plants is often merely accidental, but it appears to be some times really due to plants, which were inclosed in the cavity in which the silicious mineral itself was formed.

MOCK, v. *mŏk* [Ger. *mucken*, to make mouths at one: O. Dut. *mocken*, to mumble: Sp. *mueca*, a grimace: It. *mocca*, a mocking mouth: Gr. *mōkŏs*, mockery: OF. *mocquer*; F. *se moquer*, to mock]: to laugh at; to deride; to mimic in contempt; to subject to unnecessary disappointment; to fool; to tantalize; to make contemptuous sport of: ADJ. assumed; not real; false: N. any act of contempt or derision; a sneer; insult. MOCK'ING, imp.: ADJ. imitating in contempt or ridicule; treating with sneers: N. derision; insult. MOCKED, pp. *mŏkt*. MOCKER, n. *mŏk'ėr*, one who mocks; a scoffer; a deceiver. MOCK'ERY, n. *-ėr-ĭ*, the act of deriding and exposing to contempt by imitation or mimicry; derision; sportive insult or contempt; false show; imitation; subject of laughter or derision; vain effort. MOCK'INGLY, ad. *-lĭ*. MOCKING-BIRD: see below. MOCK-LEAD or -ORE, a sulphuret of zinc. MOCK-SUN, n. a Parhelion (q.v.). MOCK-TURTLE, a soup in imitation of turtle-soup, made of calf's-head, and often of pig's-head or cow's-head and feet. TO MAKE A MOCK OF, to turn any person or thing into ridicule.—SYN. of 'mock, v.': to ridicule; taunt; laugh at; mimic; sneer at; jeer; gibe; disappoint; in *OE.*, defeat; elude.

MOCKADO, n. *mŏk'a-dō* [from *mock*]: a fabric made in imitation of velvet; mock-velvet, made specially in Queen Elizabeth's time: mockery.

MOCK'ING-BIRD, or MOCK'ING-THRUSH (*Mimus*): genus of birds of family *Merulidæ*, having a more elongated form than the true thrushes, a longer tail, shorter wings, and the upper mandible more curved at the tip. They all are American, forming a group often placed among the Thrushes (*Turdidæ*). The best-known species, the M. of the United States (*M. polyglottus*), is about the size of the song-thrush; the upper parts of a dark brownish ash color, the wings and tail nearly black, the under

parts brownish white. The M. is common in almost all parts of America, from the south of New England to Brazil; n. of the Delaware, it is only a summer visitant, but in more southern regions it is found at all seasons. It is one of the most common birds of the W. Indies, and its exquisite song fills their groves with melody by night, for which reason it is there very generally known as the Nightingale. By day, the M. is generally imitative, excelling all birds in its power of imitation, taking up the song now of one bird, now of another, and often deceiving the most practiced ear by its perfect performance. By night, its song is usually natural. It does not confine itself to musical strains; it seems to take equal pleasure in repeating

Mocking-bird (*Mimus polyglottus*).

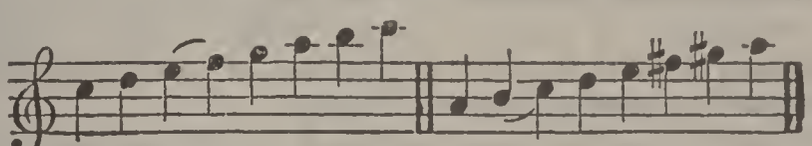
the harshest cries of the feathered tribes; and in domestication readily adds to its accomplishments the imitation of almost any sound which it is accustomed to hear, passing from one to another with great rapidity, so as to produce an incomparable medley. The M. readily learns to whistle a tune, even of considerable length, but there is no well-authenticated instance of its imitating the human voice. The barking of a dog, the mewing of a cat, the crowing of a cock, the cackling of a hen, the creaking of a wheelbarrow, all are within the compass of its powers. During its performances, it spreads its wings, expands its tail, and throws itself about, as if full of enthusiasm and enjoyment. The M. is vocal at all seasons of the year. Two or three broods are produced in a year. The male is extremely attentive to his mate, and manifests extraordinary courage in driving away enemies from the nest. Mocking-birds often assemble on such occasions, and birds of prey, far superior to them in size and strength, are compelled to retreat. Snakes are killed by reiterated blows on the head, and cats learn to consider the vicinity of a mocking-bird's nest unsafe. The food of the M. consists chiefly of berries and insects. Another species of M. is found in the Rocky Mountains, and species of the same genus are among the finest song-birds of the temperate parts of S. America.

MOCO, n. *mō′kō:* a S. Amer. animal, allied to the guinea-pig, but larger.

MODAL, a. *mō′dăl* [It. and F. *modale*—from L. *modus*, measure, method: Sp. *modal*, modal]: relating to form or mode; having the form without the essence or reality. Mo′DALIST, n. *-ĭst*, in *theol.*, one who views the Father, Son, and Holy Spirit as modes of being, and not as having distinct personality. Mo′DALLY, ad. *-lĭ*. MODALITY, n. *mō-dăl′ĭ-tĭ* [F. *modalité*]: the quality of being in form only; in *logic*, a term employed to designate propositions in which the copula is accompanied by some phrase which adds to or restricts its meaning. Mo′DAL-PROPOSI′TION, in *logic*, a proposition which affirms or denies with a qualification or limitation.

MODE, n. *mōd* [F. *mode*—from L. *modus*, measure, manner, method: It. *modo;* Gael. *modh*, manner, method: Icel. *mot*, type]: manner of existing or being; in *metaph.*, that which cannot subsist in and of itself; manner; fashion; custom; usual way or course; in *music*, the peculiar melody of the octave in its divisions, as the minor *mode*, the major *mode*. THE MODE, the prevailing fashion or custom.—SYN.: accident; gradation; degree; manner; method; form; state.

MODE, in Music: the peculiar melody of the octave in its divisions. Every musical passage is referrible to and forms part of a succession of sounds having some appreciable relation to one another. This succession of sounds is called the scale, and is a series of steps leading from a given note called the Key-note, or Tonic (q.v.), to its octave. The steps or degrees of the scale are of unequal size, and on the place of the smaller ones or semitones depends the *mode* of the music. Taking our



Major Mode. Minor Mode.

natural scale, there are only two notes in it which can satisfy the ear as key-notes—viz., C and A. In the major mode, with C as key-note, the semitone or small interval falls between the third and fourth sounds; in the minor mode, with A as key-note, it falls between the second and third sounds; in the former case, the third of the key-note is a major third, in the latter a minor third. The minor mode further requires to be modified by occasionally sharpening its sixth and seventh, in order to be pleasing to modern ears. The scale of the major mode is derived from simpler harmonic proportions than that of the minor. Melodies composed in the latter mode have generally more or less of a plaintive or melancholy character. For the theory of these modes, see MUSIC. Ancient musicians admitted of a greater variety of modes. The Greeks had six, designated the Dorian, Phrygian

Lydian, Mixo-Lydian, Ionic, and Æolian. The Ionic is the modern major, the Æolian the minor mode; the others are more or less intolerable to a modern ear. They are used to a limited extent in the music of the Greek Church, and in the Ambrosian Chant.—Mode is used more rarely to signify *key*.

MODEL, n. *mŏd′ĕl* [OF. *modelle;* F. *modèle*—from It. *modello*, a model, a frame—from L. *modŭlus*, a size or measure of a small thing—from L. *modus*, a measure]: a pattern of something to be made; a pattern in miniature; any object which an artist proposes to imitate; a copy or object for imitation; a mold; a copy or representation; that by which anything is measured or formed: V. to shape; to make a pattern or copy of in some plastic substance. MOD′ELLING, imp.: N. the art of constructing representations of things in clay or other plastic materials, as a pattern for a work of art, or as a mold for reproductions. MOD′ELLED, pp. *-ĕld:* ADJ. shaped; formed. MOD′ELLER, n. *-ẽr*, one who practices modelling; a molder or designer in clay, plaster, or wax.

MOD′ELLING: art and process of preparing the original pattern or design from which a work in sculpture is to be cast or carved: for the technical details, see SCULPTURE. M. is practiced by medallists also; the head or figure intended to be cut in the die being first modelled in relief with wax on a piece of slate. Goldsmiths, silversmiths, and jewellers also model intricate and artistic forms and ornaments of pieces of plate, to be cast and chased by them, or in which jewels are to be set. Wax is the substance used when delicacy and minuteness are required. M. is a branch of the potter's trade also. Flaxman modelled for Wedgwood numerous figures and groups in wax. For large models, the material employed is potter's clay, which, when used by sculptors, is mixed with a portion of sandstone, finely pulverized, to make it work freely.

MODENA, *mŏd′ā-nâ* or *mŏd′ĕn-â:* modern province of Italy, comprising part of the anc. duchy of M. which lay between the Po and the Mediterranean. The duchy shared the various vicissitudes which befell Italy, and participated in the great internecine feuds of the country. In 960, a member of the great House of Este was proclaimed Marquis of M.; and 1452 the then reigning marquis was created duke by Emperor Frederick III. In 1796, M. formed part of the Cisalpine Republic, but was restored 1814 by the Congress of Vienna to the reigning family. The duchy had at that time 2,310 sq. m.; pop. 586,000. In 1048, the Duke of M. was temporarily deprived of his rights; and 1860, the people definitively expelled their unpopular ruler, who carried off all the property and valuables within his reach, including the silver handles of the palace doors. The present province of M. has 960 sq. m.; pop. (1881) 279,405; (1889) 303,541; (1901) 315,804.

MO'DENA (anc. *Mutina*): fortified city of n. Italy, cap. of the former duchy of M.; 24 m. w.n.w. of Bologna. It stands between the rivers Secchia and Panaro, in a pleasant plain, noted for rich soil and salubrious air, and from its surrounding ramparts commands fine views of the Apennines. Although the social life of M. is somewhat stagnant, it is nevertheless an agreeable city. It lies on the famous Via Æmilia (see EMILIAN PROVINCES), by which it is divided into the old and new city, and is connected by a navigable canal with the rivers Secchia and Panaro. Among public buildings, may be noted the cathedral of St. Geminianus, patron of the city, a structure of the purely Lombard style. The campanile or belfry is one of the great towers of Italy; it is a square turreted structure, 315 ft. in height, its entire façade being in white marble. The ducal palace, a picturesque structure of the 17th c., is adorned with innumerable galleries, courts, and marble arches; it contains the splendid Biblioteca Estense, numbering 100,000 vols., and 3,000 rare MSS.; also the valuable Este archives, a most important collection of mediæval records, collections of coins and medals of great antiquify, and an observatory. Schools of theology, law, medicine, and mathematics have replaced the university, suppressed 1821; there are also fine museums of nat. history, a botanic garden, theatres, and good public baths. The trade of M. is unimportant: the manufactured products are confined to linen and woolen fabrics, leather, hats, paper, glass, and pottery, besides silk manufactured to a much less extent than formerly.—The ancient history of M. evidences its prosperity at an early period; the splendor, wealth, and arts of the city being mentioned by Cicero, Pliny, and Strabo.—Pop. commune (1901) 64,843.

MODERATE, a. *mŏd'ĕr-āt* [L. *moderātus*, kept within limits or bounds, temperate—from *modus*, measure, mean: It. *moderato;* F. *modéré*, moderate]: temperate; observing reasonable bounds, as in the indulgence of the appetites; in expressing opinions, etc.; not excessive, as in price or value; not extreme, as in opinions; not great; medium: V. to restrain from excess of any kind; to regulate; to reduce or lessen in violence or intensity; to allay; to pacify; to become less violent or intense. MOD'ERATING, imp. MOD'ERATED, pp. MOD'ERATELY, ad. *-lĭ.* MOD'ERATENESS, n. *-nĕs*, state of being moderate; a mean or middle state. MOD'ERATES, n. plu. *-āts*, in *Scot. eccles. hist.*, the Broad Church party in the Kirk of Scotland, who inculcated a wide toleration in ecclesiastical matters, as distinguished from the Evangelical party, who inculcated a narrow and literal adherence to the Kirk's standards. MOD'ERATOR, n. *-ā-tėr*, a president or chairman; in *Presb. churches*, the chairman of any church court; in some other denominations, the chairman of various councils and conferences; that which regulates. MOD'ERA'TORSHIP, n. *-shĭp*, the office of a moderator. MOD'ERA'TION. n. *-ā'shŭn* [F.—L.]: state of

being moderate; restraint in indulgence; temperance; calmness of mind; equanimity; forbearance. MODERA'TIONS, n. plu. a certain examination of students at Oxford. MOD'ERA'TO, ad. *-â'tō* [It.]: in *music*, denoting a movement between andante and allegro; moderately. TO MODERATE IN A CALL, among *Scot. Presbyterians*, to take the proper ecclesiastical legal steps on the part of a presbytery to induct a minister into a church, in order to give effect to the formally expressed wishes of the congregation.—SYN. of 'moderate, v.': to regulate; mitigate; qualify; temper; appease; pacify; quiet; abate; lessen; allay; repress; still; restrain.

MODERN, a. *mŏd'ĕrn* [F. *moderne*, modern—from mid. L. *modernus*, of the present mode or fashion, modern—from L. *modo*, just now, of late: It. and Sp. *moderno*, late, recent]: pertaining to the present, or time not long past; late; recent; not ancient: N. one of modern times, as opposed to one of ancient times, used in plu. MOD'ERNNESS, n. *-nĕs*, the state of being modern. MOD'ERNIZE, v. *-īz*, to render modern; to give a modern form to. MOD'ERNIZING, imp. MOD'ERNIZED, pp. *-īzd*, rendered suitable for modern usage or style. MOD'ERNIZER, n. *-ī-zĕr*, one who renders modern. MOD'ERNIZA'TION, n. *-ī-zā'shŭn*, the rendering conformable to modern usage that which is ancient or antiquated. MOD'ERNISM, n. *-ĭzm*, modern practice; something recently formed, as in language; something whose origin is not remote. MOD'ERNIST, n. *-ĭst*, an admirer of the moderns. MODERN EPOCH, in *geol.*, the existing period, embracing all formations which owe their origin to causes now in action.—SYN. of 'modern, a.': new; novel; present; fresh; common.

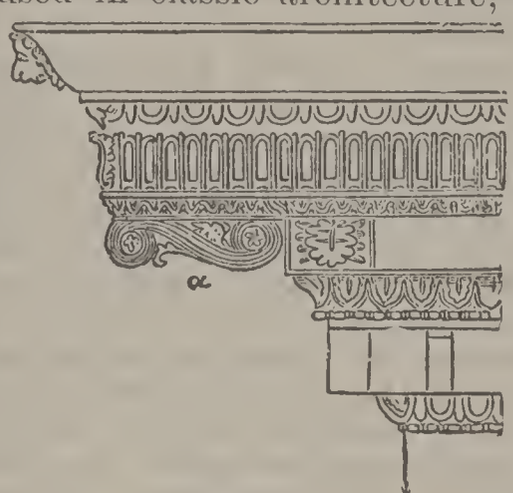
MODEST, a. *mŏd'ĕst* [F. *modeste*—from L. *modestus*, that keeps within due bounds—from *modus*, measure, limit: It. *modesto*]: restrained by a due sense of propriety; not forward or bold; unobtrusive; diffident; becoming; not excessive; reasonable; not lewd; chaste. MOD'ESTLY, ad. *-lĭ*. MOD'ESTY, n. *-ĕs-tĭ* [F. *modestie*—from L. *modestĭă*]: the lowly estimation of one's own merits, importance, or powers; unassuming conduct; propriety of manner or behavior; decency; decorum; chastity.—SYN. of 'modest': bashful; reserved; decent; shy; coy; virtuous; moderate; humble.

MODICA, *mŏd'ē-kâ* (*Mohac* of the Saracens): city of the island of Sicily, province of Val di Nota, 30 m. from Syracuse. The city, perched amid rocks, contains several fine buildings, and, notwithstanding the humidity of the climate, the sanitary condition seems satisfactory. The soil of the surrounding district is the most productive of Sicily, and yields vast quantities of corn, tobacco, oil, wine, hemp, which, with cheese, wool, soda, and butter, form the chief export trade of the place. The valley of Ipsica, or Ispica, in the vicinity of M., contains remarkable rocks, in which numerous dwellings are excavated.—Pop. of M. (1881) 37,919.

MODICUM, n. *mŏd′ĭ-kŭm* [L. *modĭcus*, small, not large—from *modus*, measure]: a little; a small quantity.

MODIFY, v. *mŏd′ĭ-fī* [F. *modifier*—from L. *modificārĕ*, to measure, to restrict, to modify—from *modus*, measure, limit; *fīō*, I become: It. *modificare*]: to change slightly, as in the form or in the external qualities of a thing; to reshape; to vary; to moderate; to lower, as sound. MOD′IFYING, imp.: ADJ. changing the form or external qualities: N. the act of slightly changing. MOD′IFIED, pp. *-fīd:* ADJ. slightly changed; qualified in certain parts. MOD′IFIER, n. *-fī-ėr*, one who or that which modifies. MOD′IFI′ABLE, a. *-fī′ă-bl*, that may be slightly changed or altered in external appearance or in qualities. MOD′IFI′ABIL′ITY, n. *-fī′ă-bĭl′ĭ-tĭ*, capability of being modified. MODIFICATION, n. *mŏd′ĭ-fĭ-kā′shŭn* [F.—L.]: the act of modifying; a slight change in form; any particular form or manner.

MODILLION, n. *mō-dĭl′yŭn* [F. *modillon*—from L. *modŭlus*, a measure]: in *arch.*, ornamental bracket (*a* in fig.), much used in classic architecture, especially at



Modillion.

regular intervals under the cornices of Corinthian and Composite entablatures.

MODIOLA, n. *mō-dī′ō-lă* [L. *modĭŏlus*, a small corn-measure—from *modĭŭs*, a Roman dry measure, a peck]: a genus of bivalves, living and fossil, distinguished from the mussels by their habit of burrowing or spinning a nest, so called in reference to the shape of the shell, which is oblong and inflated in front.

MODIOLUS, n. *mō-dī′ŏ-lŭs* [L. *mŏdĭŏlus*, the nave of a wheel—from *modĭŭs*, a measure]: in *anat.*, the central axis or pillar of the internal ear, conical in form, and extending from the base to the apex of the cochlea.

MODISH, a. *mō′dĭsh* [F. *mode*, manner—from L. *modus*, a measure, manner (see MODE)]: according to the mode or customary manner; in the mode; fashionable. MO′DISHLY, ad. *-lĭ*. MO′DISHNESS, n. *-nĕs*, state or quality of being modish or fashionable. MODIST, n. *mō′dĭst*, a follower of the fashion. MODISTE, n. *mō-dēst′* [F.]: a woman who deals in articles of fashion, particularly in dress; a woman who makes ladies' dresses in the style and mode of fashion; a dressmaker.

MODJESKA, *mōd-jĕs'ka*, HELENA: actress: b. 1844, Oct. 12, Cracow, Poland. Her father, Michael Opido, a noted musician, educated her in literature and art, but her taste for the stage was repressed until her marriage, 1860, to G. S. Modrzejewski (altered in England to Modjeska). Her first amateur acting, at Boehnia, Aust. Poland, 1861, led her husband to form a company, with which she played in the towns of Gallicia; and at Lemberg for three months, 1862. She had a theatre of her own in Czernowice; and, 1865, became leading lady in the Cracow theatre, and attained wide fame. Her attachment to the Polish stage caused her to refuse flattering offers elsewhere. After her husband's death, and her second marriage, to Charles Bozenta Chlapowski, 1868, Sep., she settled, 1869, in Warsaw, and during seven years there acted in plays of Shakespeare, Goethe, Schiller, and Molière. Removal to California, near Los Angeles, 1876, led to her studying English 1877, and entering on a period of remarkable success in Amer. and England. Madame Bozenta's husband is an Amer. citizen by naturalization.

MODOCS, *mō'doks:* tribe of Amer. Indians, originally located on a district, of abt. 4,000 sq. m., s. of Lake Klamath, Cal. In origin they were of the Klamath nation, which was seated, in three tribes, in n.w. California and over the Oregon line, along the Klamath river, from its mouth at the Pacific to its springs near the s. end of Lake Klamath. The Euroc, or down, tribe, dwelt next the Pacific; and on the upper river the Cahroc tribe. Beyond these were the Moadocs or Modocs, the name meaning 'head of the river.' As an outlying and inferior tribe, they became hostile to the Klamaths below them, and waged war with them and with the Shasteecas, trading in slave captives. Though decently clad in skins, and having for houses pits roofed with slabs and a covering of earth, they were most inferior to the Cahrocs, having heavy drowsy faces and dull yellowish eyes, with very dark skin. The whites had experience of their savage character in 1847, 49, and 50. In the last case Capt. Nathaniel Lyon chastized them at Clear Lake, and after the next trouble, a massacre of whites, 1852, Ben Wright invited them to a feast, 1855, and slaughtered 41 of the 46 who came; an act of revenge by treachery which the tribe never forgave. Gen. Crosby's campaign 1856 destroyed many of them, but the war went on to 1864, Oct. 15, when a treaty was made, under which the Modocs and Klamaths ceded all their lands except a mountainous reservation of 1,200 sq. m. on Klamath Lake. This was Klamath territory, and putting Modocs on it made trouble and led to the Modoc war. Capt. Jack (Krentpoos) led off a wild band to an old home of the M. on Lost river, where their operations raised such complaint as to bring out an order for their forcible return to the reservation. A force from Fort Klamath attacked Capt. Jack's camp with loss 1872, Nov. 29; and an Oregon force had the

same experience with another camp across the Klamath river. The two camps retreated together, massacring whites on the way, and found a natural fortress in the lava beds s. of Lake Clear. Major General Wheaton advanced on them, 1873, but was checked 3 m. from their stronghold, with 12 men killed and 21 wounded. A second attempt by General Gillem was no more successful. A third by the government commissioners resulted, 1873, Apr. 11, in the treacherous killing of General Canby and Dr. Thomas, two of the commissioners, and the wounding of a third, Mr. Meacham. June 1 the stubborn resistance of the savages ended with their surrender to Gen. J. C. Davis. Captain Jack, and three others, were tried and hung, Oct. 3, and the band of 148 sent to the Indian Territory.

MODULATE, v. *mŏd'ū-lāt* [L. *modŭlātŭs,* brought within the rules of rhythm or harmony, musical—from *modus,* measure: It. *modulare:* F. *moduler*]: *generally,* to proportion parts to each other; to vary the voice or musical sounds in a natural and pleasing manner; to vary or inflect the pitch of the voice, in reading or speaking, in a pleasing manner; in *music,* to change the key or mode. MOD'ULATING, imp. MOD'ULATED, pp.: ADJ. varied; inflected; formed to a certain key. MOD'ULATOR, n. *-lā-tėr,* that which modulates. MOD'ULA'TION, n. *-lā'shŭn* [F.—L.]: the act of varying or inflecting the pitch of the voice in speaking or reading, in a pleasing manner; that which is modulated. In *music,* the act of conducting the air and the harmony through the requisite keys and modes in a manner agreeable to the ear; the change from a major into the relative minor key, or *vice versâ.* When in the course of a melody the key-note is changed, and the original scale altered by the introduction of a new sharp or flat, such change is called modulation. Much of the pleasure of music is derived from a judicious use of modulation. The art of good modulation from one key to another consists in the proper choice of intermediate chords. Sudden transitions, without intermediate chords, should be employed only sparingly and in peculiar circumstances. Every piece of music is composed in a particular key, in which it begins and ends, which generally predominates over any other keys introduced in the course of the composition.

MODULE, n. *mŏd'ūl* [F. *module,* measure—from L. *mŏdŭlŭs,* a small measure—from *modus,* measure]: in *classic arch.,* arbitrary measure or standard taken to regulate the proportions of columns or the symmetry of the whole building. The diameter, semi-diameter, or one-third of the diameter of the base of the shaft of a column are most frequently used; the first being usually divided into 60 parts (or minutes), the second into 30 parts, the third into 20 parts.

MODULUS, n. *mŏd'ū-lŭs* [L. *mŏdŭlŭs,* a small measure

—from *modus,* measure]: in mathematics and mechanics, the constant by which quantities of one system must be multiplied to obtain the corresponding quantities of a related system; the constant of adjustment, or factor of proportionality. Thus, within limits friction is proportional to pressure and the stretching of an elastic bar is proportional to the applied force. Thus we have the modulus of friction (q.v.) and the modulus of elasticity (q.v.). The modulus of a system of logarithms (q.v.) is the multiplier by which its logarithms are obtained from those of some standard system. If *a* is the base of the former and *b* that of the latter system, the modulus is log. *ab*. Thus natural logarithms, i.e., logarithms to the base $e = 2.71828+$ may be obtained by multiplying common logarithms (base 10) by log. $_e 10 = 2.302585+$. Passing from the base *e* to the base 10, the multiplier is the reciprocal of the last number, viz., 0.4342944+.

MODUS, n. *mō'dŭs* [L. *modus,* a measure]: mode or manner: in *English law,* a compensation given in lieu of tithes. MODUS OPERANDI, *ŏp'ĕr-ăn'dī* [L. *operandum,* working—from *opus,* work]: the method of working; manner of operating; the way in which a thing is to be done.

MOELLER, *mĕl'lĕr,* HENRY, D.D.: American Roman Catholic prelate: b. Cincinnati, Ohio, 1849, Dec. 11. His elementary studies were pursued at St. Joseph's parochial school and he afterwards attended St. Xavier's College. In 1869 he went to the American College, Rome, where he followed a seven years' course in philosophy and theology. He was ordained priest in the Church of St. John Lateran, Rome, 1876, June 10, and after his return to Cincinnati was made pastor of Bellefontaine and later appointed to a professorship in Mount St. Mary's Seminary, remaining there till 1879. In 1880 Archbishop Elder named him chancellor of the diocese of Cincinnati, and on Aug. 25, 1900, he was consecrated bishop of Columbus, Ohio. In 1903, Apr., the Holy See appointed him coadjutor archbishop of Cincinnati with right of succession, and on the death of Archbishop Elder, 1904, Oct. 31, he assumed charge of the archdiocese, the pallium being conferred upon him 1905, Feb. 15.

MOELLER, LOUIS: American genre painter: b. New York 1855, Aug. 5. He worked with his father, a decorator, for four years; studied in Munich with Diez and Duveneck; and in 1883 returned to New York. He became a member of the National Academy in 1895, and has exhibited there since 1883. Among his works are: *Morning News, Puzzled, Short Measure, An Interior,* etc.

MÖEN, *mö'ĕn:* Danish island in the Baltic Sea, separated from Seeland on the n.w. by the *Ulfsund,* and from Falster on the s.w. by the *Grönsund.* It is 19 m. long, by about 5 m. in average breadth; 84 sq.m. The people are supported by agriculture, fisheries, and commerce. Pop. of island, about 15,000.

MŒRIS, Lake, *mē′rĭs:* ancient name of a sheet of water in Egypt, now known as *Birket-el-Kerûn* or *El-Korn* ('Lake of the Promontory'); in the province of Fayûm, about 50 m. s.w. of Cairo; extreme length n.e. to s.w., 30 m.; breadth, 6 m.: it was formerly much larger. Its average depth is 12 ft., and its greatest ascertained depth 28 ft. On the n. and w., its shores are rocky, but on the s., flat and sandy. It is connected with the Nile by a canal, *Bahr-Jusuf* ('River of Joseph'). The waters are brackish, being impregnated with the alkaline salts of the desert and with the muriate-of-lime depositions of the surrounding hills. In the time of the Pharaohs, the revenue from the fisheries was applied to the maintenance of the queen's wardrobe and perfumes. Under the Persians, the fisheries were let (during the season of the inundations, at a sum equivalent to $750 a day. At present they yield but little more than $400 a year.

MŒSIA, *mē′shĭ-a:* ancient Roman province, bounded by the Danube on the n., the Black Sea on the e., the mountain-chains of *Hæmus* (Balkan) and *Orbelus* on the s., that of *Scardus* and the rivers *Drinus* (Drina) and *Savus* (Save) on the w. The river *Ciabrus* (Cibriz) divided it into two parts, of which the Eastern (*Mœsia Inferior*) is the present Bulgaria, and the Western (*Mœsia Superior*) is Servia. Its original inhabitants were mostly of Thracian race. Gaulish or Celtic invaders settled in W. Mœsia about B.C. 277, under the name of *Scordisci.* The Romans came in contact with the tribes of M. first after the conquest of Macedonia, when C. Scribonius Curio forced his way as far n. as the Danube, and gained a victory over the Mœsians (B.C. 75); but the country was not completely subjugated till B.C. 29. It was made a Roman province in the reign of Augustus, prob. abt. B.C. 16, and flourished for more than two centuries; but as a frontier province it was exposed to hostile invasions, and required a line of fortresses and stations all along the s. bank of the Danube. In A.D. 250, the Goths made an irruption into the country, and defeated and slew the Roman emperor, Decius. At last, about the end of the 4th c., M. was given up to them (known afterward as Mœso-Goths) by Emperor Theodosius I. Slavonian tribes settled in M. in the 6th and 7th centuries.

MŒSO-GOTHS, n. *mē′zō-gŏths* [from Mœsia—q.v.]: later name of the Goths who in the 3d c. settled in Lower Mœsia, at the mouth of the Danube. Ulfilas (q.v.) was a Mœso-Goth. The name, however, became of more general use to designate those who remained in Mœsia after the great migration in the beginning of the 5th century. Mœso-Gothic, n. language of the Mœso-Goths: Tedj. of or pertaining to. Mœso-Gothic Gospels: see Ulfilas.

MOFFAT, *mŏf′at:* market-town and favorite watering-place of Scotland, county of Dumfries; in the upper part of the broad and beautiful valley of the Annan, surrounded by hills of moderate elevation, 19 m. n.n.e. of Dumfries. A short railway to connect M. with the main

Caledonian line was opened 1883. Among the public edifices are the baths and the reading and assembly rooms. The mineral springs, the principal of which, like that of Harrogate, is saline and sulphurous, are quite famous; but perhaps the greatest attractions of the place are its salubrious air and exquisite environs. Northward are the Moffat Hills; highest summit, Hartfell, 2,650 ft. During the season, the town is increased in population by from 800 to 1,000 visitors, to suit whose convenience great numbers of elegant villas, commanding fine views of the neighboring country, have been erected.—See Black's *Guide to M.*—Pop. (1881) 2,161; (1891) 2,290.

MOF'FAT, Robert, d.d.: Christian missionary: 1795, Dec. 21—1883, Aug. 9; b. Ormiston, East Lothian, Scotland; of humble parentage. Having resolved to become a missionary to the heathen, he offered his services 1814 to the London Missionary Soc. (see Missions, Christian), and was sent by them 1816 to s. Africa. Arriving at Cape Town 1817, he immediately proceeded beyond the boundaries of Cape Colony to Namaqualand, where he entered on his labors at the kraal of Africaner, a powerful chief whose name had long been a terror to the people of the neighboring districts of the colony, for his audacious raids among their settlements, and for his ferocious character, but who, under M.'s influence, became a convert to Christianity. Here M.'s efforts had great success, Christianity and civilization advancing together. But the situation, on account of the drought and sterility of the country, and its very thinly scattered population, was unsuitable for a principal and permanent mission-station. M. returned to Cape Town 1819, where he married an excellent and heroic woman, to whom he had become engaged in England—his untiring helper for 50 years; and 1820 they went to Griqua Town, and ultimately to Kuruman, among the Bechuanas, w. of the Vaal river. Here he labored devotedly till the infirmities of age compelled his return to his native country 1870. He had an intermission of a few years in Britain, ending 1842. Wherever he went, the gospel was gladly received by some of those who heard it, and in some places by many. Alone, he translated the whole Bible into Bechuana—creating a written language. In every place he guided the people also in the arts of civilized life. He made frequent and extended missionary tours, in which his adventures were very remarkable, and are graphically described in his work, *Missionary Labors and Scenes in Southern Africa* (Lond. 1842). His daughter became the wife of the African missionary explorer, Dr. Livingstone, who was largely influenced by M. in choosing his life-work. In 1873, he was presented with a testimonial of £5,800 in recognition of his great services in Christianizing and civilizing the savage tribes from Kuruman almost to the Zambesi. He lectured on African missions in Westminster Abbey 1875; and 1881 the Lord Mayor of London held a banquet in his honor. He died at Leigh, near Tunbridge Wells.

MOFUSSIL, *mō-fŭs'sĭl* [from Arabic word meaning 'separate']: term commonly used by Anglo-Indians for the rural part of a district as opposed to the administrative headquarters. Thus in Bengal the M. means practically the whole province beyond the city of Calcutta.

MOGADOR, *mŏg-a-dōr'*, or SUEIRA, or SUERAH, *swē'râ:* fortified town and seaport, cap. of the province of Haha; 130 m. w.s.w. of the city of Morocco. It stands on a rocky promontory, opposite a small island which forms the harbor, and is said to be the best-built town in the kingdom of Morocco. Though the harbor has a sheltered appearance, it is very dangerous in w. and s.w. winds. The streets are regular, though narrow; and the town consists of two parts, each surrounded by water. The quarter called the Fortress contains the custom-house and the treasury, and is the residence of the pasha, the vice-consuls, and the Christian merchants. The town is defended by four batteries on the island, and by a fort on the land-side; the walls also are defensible. M. is the seat of considerable trade; it exports olive-oil, wool, gum, hides, feathers, gold-dust, and almonds. Commerce is mainly in the hands of the Jews. The chief imports are woolens, cottons, and hardware. The total imports have annual value between $1,000,000 and $1,500,000; exports have about the same value. The climate is remarkably equable. Pop. about 20,000.

MOGAR, n. [native W. Indian]: the dried stick of the sugar-cane.

MOGRABIAN, a. *mō-grā'bĭ-an* [Ar. and Turk. *mogh-reb*, the west, n.w. Africa]: of or pertaining to north or northwest Africa: N. a native or inhabitant of north or northwest Africa.

MOGUER, *mō-gär'* [Ar. 'eaves,' of which there are many in the neighborhood]: town of Spain, province of Huelva, 43 m. w.s.w. of Seville, rising gently above the Rio Tinto, near the mouth of which is its port, Palos. The streets are generally broad and straight, but both the town and castle are dilapidated. The old Franciscan convent was ordered 1846 to be preserved as a national memorial, but it is now fast going to ruin, and the wood of the cells stripped off. Here, 1484, Columbus, craving charity, was received by the prior, Juan Perez de Marchena, by whose influence he was enabled to prosecute his discoveries, setting out from the port of Palos 1492, Aug. 3. To this port also he returned 1493, Mar. 15, after having accomplished the great end of his expedition. Here likewise did Cortes land 1528, May, after the conquest of Mexico, and lodged in the same convent which gave shelter to Columbus. Palos is now a poor decayed fishing-port. M. has some trade in wine and fruit. Pop. abt. 8,350.

MOGUL, n. *mō-gŭl′*, or GREAT MOGUL [Pers. and Ar. *mughal*, a native of Tartary]: popular designation of the emperor of Delhi, as the impersonation of the powerful empire established in Hindustan by the Monguls (q.v.), who were called *Moguls* by the Persians. The first Great Mogul was Baber, great-grandson of Timûr, who founded the Mongul empire in Hindustan 1526. In 1803, the Great Mogul was deprived of his throne; 1827 he lost even the appearance of authority, becoming a mere pensioner of the British; and 1858 Mohammed Bahadûr, last of the dynasty, was transported for complicity in the Indian mutiny. (The true spelling is *Mughal.*)

MOGUNTINE, a. *mō-gŭn′tĭn* [L. *Moguntia*, *Moguntiacum*, ancient name of the town]: of or pertaining to Mainz, in Germany.

MOHACS, *mō-hâtch′:* market-town of Hungary, 110 m. s.s.w. of Pesth, on the w. arm of the Danube. It contains a gymnasium, has an important cattle-market, is a station for steam-boats on the Danube, and the seat of considerable trade in wine, coal, timber, and agricultural produce. Pop. (1890) 14,403. It owes its historical importance to the great battle here, 1526, Aug. 29, between Lewis II. of Hungary, with 25,000 Hungarians, and the Sultan Soliman, at the head of about 200,000 Turks. The battle resulted in the disastrous defeat of the Hungarians, who lost their king, 7 bishops, many nobles and dignitaries, and more than 22,000 men. A second battle was fought here, 1687, Aug. 12, when the Turks in their turn were defeated by an Austro-Hungarian army under Charles of Lorraine. These two battles mark the beginning and end of Turkish dominion in Hungary.

MOHAIR, n. *mō′hār* [said to be from Ar. *mokhayyar*, a kind of hair-cloth: Ger. *mohr;* F. *moire;* OF. *mouäire*]: a sort of camlet; the fine, soft, silky, long, pure white wool or hair of the Angora goat, native of Asia Minor; also the cloth made of its wool. Each animal yields 2 to 4 lbs. of wool at the annual clip, Apr. or May; and the exportation in recent years has grown very large: see GOAT: ANGORA: WOOLEN MANUFACTURE.—The Angora goat has not been acclimatized in Europe; but in 1849, and at various times since, flocks have been introduced into the United States—Va. and other southern states, and Or., Cal., and some other western states. In these high regions, with dry air, the flocks thrive and are now numerous.—M. is also a general term for cloth made of hair: spelled also MOIRE, which see.

MOHAMMED, n. *mō-hăm′ĕd* [Ar. *muhammad*, praiseworthy—from *hamd*, praise]: founder of the Mohammedan religion (see below). MOHAMMEDAN, a. *mō-hăm′ĕ-dăn*, of or relating to Mohammed or to his religion: N. a believer in Mohammed. MOHAM′MEDANIZE, v. *-īz*, to convert or make conformable to the religion of Mohammed. MOHAM′MEDANISM, n. *-ĭzm*, the system of religion founded by Mohammed, the principles of which are contained in the *Koran:* see below.

MOHAMMED, *mo-hăm'ĕd* (Arab. *the Praised**): founder of Islam: about 570–632, June 8; b. at Mecca, Arabia; son of Abdallâh, of the family of the Hâshim; and of Amina, of the family of Zuhra, both of the powerful tribe of the Koreish, but of a side-branch only, and therefore of little influence. His father, a poor merchant, died either before or shortly after M.'s birth, whom his mother then (according to a doubtful tradition) is supposed to have handed over, after the fashion of her tribe, to a Bedouin woman, that she might nurse him in the salubrious air of the desert. In consequence of the repeated fits of the child, however, which were ascribed to demons, the nurse sent him back in his third year. When he was six years old, his mother died; his grandfather, Abd-Al-Mutallib, adopted the boy; and when, two years later, he too died, M.'s uncle, Abu Talib, though poor himself, took him into his house, and remained his best friend and protector throughout his life. The accounts which have survived of the time of his youth are too legendary to deserve credit; certain, however, it seems to be that he at first gained a scanty livelihood by tending the flocks of the Meccans, and that he once or twice accompanied his uncle on his journeys to s. Arabia and Syria. In his 25th year, he entered the service of a rich widow, Chadîdja, likewise descended from the Koreish; and accompanied her caravans—in an inferior capacity, perhaps as a camel-driver—to the fairs. Till that time, his circumstances were very poor. Suddenly his fortune changed. The wealthy, but much older, and twice widowed Chadîdja offered him her hand, which he accepted. She bore him a son, Al-Kâsim—whence M. adopted the name Abu Al-Kâsim—and four daughters: Zainab, Rukaija, Umm Kulthûm, and Fâtima; and afterward a second son, whom he called Abd Manâf, after an idol worshipped among his tribe. Both his sons, however, died early. M. continued his merchant's trade at Mecca, but without much energy, spending most of his time in solitary contemplations. In his 35th year, he is said to have, by chance only, been chosen arbiter in a quarrel about the replacing of the sacred black stone in the Kaaba (q.v.); but not before his 40th year is there anything really important to be told of his life.

Before entering on the weighty events of the subsequent period, it is well to advert to such traits of M.'s outward appearance as are yet recoverable. He was of middle height, rather lean, but broad shouldered, and altogether of strong build; slightly curled black hair flowed round his strongly developed head; his eyes, overhung with thick eyelashes, were large and coal-black; his nose, large and slightly bent, was well formed. A long beard added to the dignity of his appearance. A black mole between his shoulders became afterward among the faithful 'the seal of prophecy.' In his walk,

* M. is spelled also *Muhammad*, *Mohammad*, *Muhaumad*, and (less correctly) *Mahommed*, *Mahomet*, and (anciently) *Mahound*.

he moved his whole body violently, 'as if descending a mountain.' His gait and presence altogether were extremely imposing. In his 40th year M. received his first 'revelation,' in other words, became first aware that he had a 'mission.' About the year 600, Christianity had penetrated into the heart of Arabia, through Syria on the one hand and Abyssinia on the other. Judaism was no less prominent in the peninsula, chiefly in its n. parts, which were dotted over with Jewish colonies, founded by emigrants after the destruction of Jerusalem; and round about Yathrib (Medina). Besides these two all-important religious elements, several sects, remnants of the numerous ancient sects which had sprung up everywhere during the first Christian centuries: Sabians, Mandæans, etc., on the frontiers of Syria and Babylonia, heightened the religious ferment which, shortly before the time of M., had begun to move the minds of the thoughtful in all that portion of the East. At that time there arose, according to undoubted historical accounts, several men in the Hedjaz (Waraka, Obeid Allah, Othman, Zayd, etc.), who preached the futility of the ancient pagan creed, with its star-worship, its pilgrimages, and festive ceremonies, its temples and fetiches. It had in reality long ceased to be a living faith, and only the great mass of the people clung to it as to a sacred inheritance from times immemorial. The unity of God, the 'ancient religion of Abraham,' was the doctrine promulgated by these forerunners of M., and many of those who, roused by their words, began to search for a form of religion which should embody both the traditions of their forefathers and a purer doctrine of the Divinity, turned either to Judaism or to Christianity. The principal scene of these missionary labors was Mecca, then the centre of the pilgrimages of most of the Arabian tribes, and where, from times immemorial, long anterior to the city itself, the Kaaba (q.v.), Mount Arafat, the Valley of Mina, etc., were held sacred—the Koreish, M.'s tribe, having the supreme care over these sanctuaries, ever since the 5th c. It was under these circumstances that M. felt 'moved' to teach a new faith, which should dispense with idolatry on the one, as with Judaism and Christianity on the other hand. He was 40 years of age when he received the first 'divine' communication in the solitude of the mountain Hirâ, near Mecca. He declared that Gabriel appeared to him, and in the name of God commanded him to 'read'—that is, to preach the true religion, and to spread it abroad by committing it to writing (Sur. xcvi.). How far M. was a 'prophet,' in the usual sense of the word, has been the subject of endless and utterly futile discussions in the Christian world. That he was no vulgar impostor, is now as generally recognized as that other once popular doctrine, that he was in conscious league with the devil, is rejected by thinking men. What part his epilepsy had in his 'visions,' we are not able to determine. Certain it is that, after long and painful solitary broodings, a something—not clearly known to himself—at times moved

him with such fearfully rapturous vehemence, that, during his revelations, he is said to have roared like a camel, and to have streamed with perspiration; his eyes turned red, and the foam stood before his mouth. The voices he heard were sometimes those of a bell, sometimes of a man, sometimes they came in his dreams, or they were laid in his heart. Waraka, one of his wife's relatives, who had embraced Judaism, spoke to him of the Jewish doctrine, and told him the story of the patriarchs and Israel; not so much as it is told in the Bible, but as in the Midrash; and the gorgeous hues of the legendary poetry of the latter seem to have made as deep an impression on M.'s poetical mind as the doctrine of the unity of God and the *morale*—in its broad outlines—of the Old Testament, together with those civil and religious laws, scriptural and oral, which are either contained as germs or fully developed in this record. Christianity exercised a minor influence on him and his spiritual offspring. All his knowledge of the New Testament was confined to a few apocryphal books, and with whatever reverence before Jesus, whom, together with Moses, he calls the greatest prophet, next to himself, his notions of the Christian religion and its founder were excessively vague. For some details on these points, see KORAN: MOHAMMEDANISM.

His first revelation (about 610) he communicated to no one, as it appears, except to Chadîdja, to his daughters, his stepson Ali, his favorite slave Zaid—whom he had probably freed and adopted by this time—and to his friend the prudent and honest Abu Bekr. His other relatives rejected his teachings with scorn. Abu Lahba, his uncle, called him a fool; and Abu Talib, his adoptive father, though he never ceased, for the honor of his family, to protect him, yet never professed any belief in M.'s words. In the fourth year of his mission, however, he had made 40 proselytes, chiefly slaves and people from the lower ranks; and now first some verses were revealed to him, commanding him to come forward publicly as a preacher, and to defy the scorn of the unbelievers. With all his power, he now inveighed against the primeval superstition of the Meccans, and exhorted them to a pious and moral life, and to the belief in an all-mighty, all-wise, everlasting, indivisible, all-just, but merciful God, who had chosen him as he had chosen the prophets of the Bible before him, so to teach mankind that they should escape the punishments of hell, and inherit everlasting life. God's mercy—this was a primitive doctrine, common to the whole East—was to be obtained principally by prayer, fasting, and almsgiving. The belief in the sacredness of the Kaaba and the ceremonies of the old heathen pilgrimage was too firmly rooted in his and the people's minds not to be received into the new creed; but certain barbarous habits of the Bedouins, such as the killing of their new-born daughters, were ruthlessly condemned by M. The prohibition of certain kinds of food also belongs to this first period, when he as yet stood

entirely under the influence of Judaism; the prohibition of gambling, usury, etc., probably being of somewhat later date. Whether he did or did not understand the art of writing and reading at the commencement of his career, is not clear; certain it is that he pretended not to know it, and employed the services of amanuenses for his Koranic dicta, which at first consisted merely of brief, rhymed sentences in the manner of the ancient Arabic soothsayers (see KORAN). The Meccans did not object to his doings; they considered him a common 'poet' or 'soothsayer,' who, moreover, was not in his right senses, or simply a liar. Gradually, however, as the number of his converts increased, they began to give more and more attention to his proceedings; and finally, fearing mostly for the sacredness of Mecca, which the new doctrine might abolish, thus depriving them of their chief glory and the ample revenues of the pilgrimages, they rose in fierce opposition against the new prophet and his adherents, who dared 'to call their ancient gods idols, and their ancestors fools.' Many of the converted slaves and freedmen had to undergo terrible punishments; others suffered so much at the hands of their own relatives, that they were fain to revoke their creed; so that the prophet himself advised his followers to emigrate to Abyssinia. M. himself, though protected by the strong arm of Abu Talib, was yet at that time so low-spirited and fearful, that he even raised in his doctrine the idols, which hitherto he had represented as naught, to intermediate beings between God and man—a dictum, however, which he soon revoked as an inspiration of Satan, thereby increasing the hatred of his adversaries, at whose head stood two members of the family of Machzûm, Al-Walid and Abulhakam Amr (called by Mohammed 'Father of Foolishness'), who in every way threw ridicule on him. At last it became necessary that he should be put beyond the reach of his persecutors, and Abu Talib hid him in a fortified castle of his own in the country. Hamza, his uncle, and Omar, formerly a bitter enemy of M., and who afterward became, next to M. and Abu Bekr, the third head of Islam, continued in the mean time to spread the new doctrine. The Koreish now demanded that M. should be delivered into their hands; but Abu Talib steadfastly refused to comply with their wishes; a feud thereupon broke out between their family and that of the Hashemites, and M. and all the members of his family, except, perhaps, Abu Lahab, were excommunicated. After three years, however, the 'peace party' in Mecca brought about a reconciliation, and M. was allowed to return. A great grief befell him at this time—his faithful wife Chadîdja died, and, shortly afterward, his uncle Abu Talib, and, to add to his misery, the vicissitudes of his career had reduced him by this time to poverty. An emigration to Taïf, where he sought to improve his position, proved a failure; it was with great difficulty that he escaped with his life. During this epoch, he had the well-known dream of his journey to

Jerusalem and in the heavens on the back of the Borak (Miraj), (see AL-BORAK), the relation of which caused even his stanchest adherents to smile at his hallucination. Shortly after his return from Taïf, he married Sauda, and afterward so increased the number of his wives, that at his death he left nine, of whom Ayeshah, daughter of Abu Bekr, and Hafsa, daughter of Omar, are best known. In the midst of his vain endeavors to find a hearing in his own city, and cities near it, he succeeded, during a pilgrimage, in converting several men of Medina, whose inhabitants had long been accustomed to hear from the mouths of the numerous Jews living in the city and its neighborhood the words Revelation, Prophecy, God's Word, Messiah: to the Meccans mere sounds without any meaning. The seed sown in the prepared minds of these men bore a fruitful harvest. The next pilgrimage brought 12, and the third more than 70 adherents to the new faith from Medina, and with these he entered into close alliance. M. now conceived the plan to seek refuge in the friendly city of Medina, and about 622 (10, 13, or 15 years—according to the different traditions—after his first assuming the sacred office) he fled thither, about 100 families of his faithful flock having preceded him, accompanied by Abu Bekr, and reached, not without danger, the town, called thence Medinat Annabi (City of the Prophet), or Medina 'City,' by way of eminence; and from this flight, or rather from the first month of the Arabic year preceding it (i.e., 68 days earlier), dates the Mohammedan Era [Hedjrah], A.D. 622, July 15 or 16 (see HEGIRA). Now everything was changed to the advantage of the prophet and his religion; and while the incidents of his previous life are shrouded in comparative obscurity, those after this date are known often to their insignificant details. Formerly a despised 'madman or impostor,' he now assumed at once the position of highest judge, lawgiver, and ruler of the city and two most powerful Arabic tribes. His first care was directed toward the consolidation of the new worship, and the inner arrangements in the congregation of his flock; his next chief endeavor was to proselytize the numerous Jews who inhabited the city, to whom, besides having received their principal dogmas into his religion, he made many important concessions also in the outer observances of Islam, and concluded alliances with many of their tribes; but he was sorely disappointed in his hopes to convert them. They ridiculed his pretension to be the Messiah, and so enraged him by their constant taunts, that he soon abrogated his concessions, and became their bitterest adversary up to the hour of his death. The most important act in the first year of the Hedjrah was his permission of his followers to go to war with the enemies of Islam in the name of God—a kind of manifesto directed chiefly against the Meccans. Not being able at first to fight his enemies in open field, he endeavored to weaken their power by attacking the caravans of the Koreish on their way to Syria. Being successful

enough to disturb their trade, and, at the same time, to conclude alliances with the adjoining Bedouin tribes, he at last dared to break even the peace of the sacred month of Radjab, and with this the signal to open warfare was given. A battle, the first, was fought between 314 Muslims and about 600 Meccans at Badr, in the second year of the Hedjrah; the Muslims gained the victory, and made many prisoners. A great number of adventurers now flocked to M.'s side, and he successfully continued his expeditions against the Koreish and the Jewish tribes, chiefly the Beni Keinukâ, whose fortified castles he took after a long siege. Notwithstanding a severe loss which he suffered in the battle near Ohod, in which he himself was dangerously wounded, his power increased so rapidly that as early as in the sixth year of the Hedjrah (A.D. 628) he was able to proclaim a public pilgrimage to Mecca. Although the Meccans did not allow this to be carried out, he gained the still greater advantage that they concluded a formal peace with him, and thus recognized him as an equal power and belligerent. He was now allowed to send his missionaries all over Arabia, and even beyond the frontiers, without any hindrance; and in the following year he had the satisfaction of celebrating the pilgrimage for three days undisturbed at Mecca. Shortly afterward, during his expeditions against the Jews of Chaibar and Fadak, M. very nearly lost his life: a Jewess, Zainab by name, a relative of whom had fallen in the fight against him, placed a poisoned piece of roast meat before him, and though he merely tasted it, he yet, till his death, suffered from the effects of the poison. His missionaries at this time began to carry his doctrines abroad, to Chosroes II., to Heraclius, to the king of Abyssinia, the viceroy of Egypt, and the chiefs of several Arabic provinces. Some received the new gospel: but Chosrû Parvis, King of Persia, and Amru the Ghassanide, rejected his proposals with scorn, and the latter put to death his messenger. This was the cause of the first war between the Christians and the Muslims, in which the Muslims were beaten by Amru with great loss. The Meccans now thought the long-desired moment of revenge at hand, and broke the peace by several acts of violence against the Chuzaites, allies of M.; but he marched at the head of 10,000 men against Mecca, before its inhabitants had time to prepare for the siege, took it, and was publicly recognized by them as chief and prophet. With this the victory of the new religion was secured in Arabia. While, however, employed in destroying all traces of idolatry in the besieged city, and fixing the minor laws and ceremonies of the true faith, M. heard of new armies which several warlike Arabic tribes were bringing against him, and which were concentrated near Taïf (630). Again he was victorious, and his dominion and creed extended further and further every day. From all parts flocked the deputations to do homage to him in the name of the various tribes, either as the messenger of God, or at least as the Prince of Arabia; and the

year 8 of the Hedjrah (A.D.630) was therefore called the year of the Deputations. Once more he made extensive preparations for a war against the Byzantines; but not being able to bring together a sufficient army, he had to be satisfied with the homage of a few minor princes on his way to the frontiers, and to return without fulfilling his intention. Toward the end of the 10th year of the Hedjrah (A.D. 631) he undertook, at the head of at least 40,000 Muslims, his last solemn pilgrimage to Mecca, and there (on the Mount Arafat—q.v.) instructed them in all the important laws and ordinances, chiefly of the pilgrimage; and the ceremonies observed by him on that occasion were fixed for all times (see HAJJ). He again solemnly exhorted his believers to righteousness and piety, recommending them chiefly to protect the weak, the poor, and the women, and to abstain from usury.

Returned from Mecca, M. occupied himself again with planning his expedition against Syria, but fell dangerously ill very soon after his return. One night, while suffering from an attack of fever, he went to the cemetery of Medina, and prayed and wept upon the tombs, praising the dead, and wishing that he himself might soon be delivered from the storms of this world. For a few more days he went about; at last, too weak further to visit his wives, he chose the house of Ayeshah, near a mosque, as his abode during his sickness. He continued to take part in the public prayers as long as he could; until at last, feeling that his hour had come, he once more preached to the people, recommending Abu Bekr and Usma, the son of Zaid, as the generals whom he had chosen for the army. He then asked, like Moses, whether he had wronged any one, and read to them passages from the Koran, preparing the minds of his hearers for his death, and exhorting them to peace among themselves, and to strict obedience to the tenets of the faith. A few days afterward, he asked for writing materials, probably in order to fix a successor to his office as chief of the faithful; but Omar, fearing he might chose Ali, while he himself inclined to Abu Bekr, would not allow him to be furnished with them. In his last wanderings he spoke only of angels and heaven. He died in the lap of Ayeshah, about noon of Monday the 12th (11th) of the third month, in the year 11 of the Hedjrah (A.D. 632, June 8). His death caused immense excitement and distress among the faithful, and Omar, who himself would not believe in it, tried to persuade the people of his still being alive. But Abu Bekr said to the assembled multitude: 'Whoever among you has served Mohammed, let him know that Mohammed is dead; but he who has served the God of Mohammed, let him continue in his service, for he is still alive, and never dies.' While his corpse was yet unburied, the quarrels about his successor, whom he had not been able definitively to appoint, commenced; and finally, Abu Bekr received the homage of the principal Muslims at Medina. M. was then buried in the night June 9-10, after long discussions, in the house of

Ayeshah, where he had died, and which afterward became part of the adjoining mosque.

This, in briefest outline, is M.'s career, not presenting at any length, either the peculiar circumstances of his inner life, which preceded and accompanied his 'prophetic' course, nor the part which Idolatry, Judaism, Christianity, and his own reflection respectively, bore in the formation of his religion; nor tracing the process by which his 'mission' grew upon him, and he, from a simple admonisher of his family, became the founder of a faith to which more than 130 millions are said now to adhere. For some further details on his doctrine and its history, see KORAN: MOHAMMEDANISM: also MOHAMMEDAN SECTS: SUNNA: SUNNITES: SHIITES. It is to be remembered that a man of M.'s extraordinary powers and peculiar nature is not to be judged by a modern commonplace standard; also the manners and morals of his own time and country must be taken into consideration. His character certainly is not praiseworthy. He was at times deceitful, cunning, revengeful, and cowardly; he ordered many assassinations, and massacred at one time 600 Jews; and he was addicted to sensuality beyond all limits. But all this does not justify the savage and silly abuse which has been heaped upon his name for centuries by ignorance and fanaticism. Consideration must be had not only of his public station as prophet, preacher, and prince, but also his general amiability, his faithfulness toward his friends, his tenderness toward his household, and his occasional readiness to forgive an enemy: moreover the extreme simplicity of his domestic life (he lived, when in full power, in a miserable hut, mended his own clothes, and freed all his slaves), must be taken into consideration: and, to do him justice, his melancholic temperament, his nervousness often bordering on frenzy and which brought him to the brink of suicide, and the fact that he was a poet of high order, with all the weaknesses of a poet developed to excess, must not be forgotten. Altogether, his mind contained the strangest mixture of nobleness and baseness, of truth and error. Although his self-chosen mission was the abolition of superstition, he yet believed in Jins, omens, charms, and dreams: and this is an additional reason against the now generally abandoned notion, that he was a vulgar designer, who by no means deceived himself about those revelations which he pretended to have received. And however much the religion of Islam may be considered the bane and prime cause of the rottenness of eastern states and nations in our day, it must not be forgotten, in the first place, that it is not necessarily Islam which has been the sole cause of the corruption; and in the second place, that Mohammed is not to be made responsible for all the errors of his successors. Fanaticism may be the secret of the strange mixture in his character, and the source of his consuming zeal; partly the fanaticism of a stern rude justice, partly the fanaticism of a self-exaltation verging on mental disorder, and drawing from his cataleptic fits

the fabric of those hallucinations which he accepted and proclaimed as revelations from God. His fanaticism seems to have become less honest as his power advanced, and his later years give signs of that hypocrisy which seeks to use spiritual motives for merely political ends.

The most important European biographies of M. are those of Sprenger, Weil, Muir, Nöldeke, Reinaud.

MOHAM'MED II. (Bujuk or The Great), Sultan of Turkey: conqueror of Constantinople: 1430–81 (reigned 1450–81); b. Adrianople; son and successor of Amurath II. His first acts were the murder of his two brothers, and the suppression of a rebellion in Karaman. Having thus secured himself on the throne, he bent all his energies to the great project always kept prominently in view by his predecessors—the capture of Constantinople. This city was now the sole remnant of the once mighty empire of the Cæsars; and after more than a year spent in preparations, M. commenced the siege, 1453, Apr. 6, with an army of 258,000 men, and a fleet of 320 vessels. The Greeks, aided by a gallant band of 2,000 strangers, under Gian Justiniani, a noble Genoese, long maintained an obstinate resistance. On the morning of May 29, a combined attack was made by land and sea without success; but the retirement from the ramparts of Justiniani, who had been severely wounded, and despaired of a successful defense, caused a panic among his followers, and the simultaneous charge of a chosen body of janizaries, with M. himself at their head, was irresistible. Constantine XIII. died in the breach, and the Turks poured in over his corpse to plunder and devastate his capital. M. transferred the seat of his government to Constantinople, and sought to win back the inhabitants by promising them free exercise of their religion. He next reduced the kingdoms of Morea and Trebizond, offshoots of the Greek empire, obtained possession of Servia on the death of its last prince, and made formidable preparations for invasion of Hungary. Belgrade was the first point of attack; and with 100,000 men, supported by a fleet of 200 ships on the Danube, M. sat down before its walls. The enormous ordnance which had done such good service at Constantinople, were employed to batter the ramparts; but the valor, skill, and activity of the defenders foiled his utmost efforts. John Hunyady (q.v.), who, with 5,000 chosen troops, had reinforced the garrison, destroyed or captured all his vessels, and soon afterward by a sudden sally, defeated his army, and carried off the battering-train, compelling him to raise the siege, 1456, Aug. 6. M.'s next enterprise was the invasion of Epirus, where Scanderbeg had hitherto successfully defied the sultan's power. Three Turkish armies were destroyed in rapid succession, and a fourth and fifth under M. himself met with no greater success; but the death of the gallant Epirote, 1467, removed the only obstacle to the sultan's plans, and Epirus was forthwith annexed to Turkey. The latter half of M.'s reign was fruitful in important achievements; he reduced the Khan

of the Crimea to the condition of a vassal, deprived the Genoese of Caffa, and the Venetians of Friuli, Istria, Negropont, and Lemnos; but the Knights of St. John repelled him from Rhodes, and the Venetians from Scodra. He carried his arms into Italy, and took Otranto; but died at Nicomedia, while on the way to join his son Bajazet, who was warring with the Persians and Egyptians. His frequent contests with the former of these nations had always interfered with the successful prosecution of his designs of conquest in Europe. M. had great abilities; he was brave, enterprising, and sagacious; nor was he deficient in learning, for he spoke four languages fluently, was well versed in geography, ancient history, and the natural sciences, and was practically acquainted with the fine arts. But the brilliancy of his career, and the occasional generosity and even magnanimity which he showed, cannot obliterate the recollection of those acts of cruelty and treachery which have justly branded him as the most ruthless tyrant of the House of Osman. As the founder of the Turkish power in Europe, his memory has always been revered by the Turks.

MOHAM'MEDANISM: the religion founded by Mohammed (q.v.); according to him, the only orthodox creed existing from the beginning of the world, and preached by all the prophets ever since Adam. It is called also *Islâm*, Resignation, entire Submission to the will and precepts of God. In its exclusively dogmatical or theoretical part, it is *Imán*, Faith; in its practical, *Dín*, Religion (by way of eminence). The fundamental principles of Imán are contained in the two articles of belief: 'There is no God but God; and Mohammed is God's Apostle.' The Mohammedan doctrine of God's being and attributes coincides with the Christian, so far as relates to him as the Creator of all things in heaven and earth, who rules and preserves all things; who is without beginning, omnipotent, omniscient, omnipresent, and full of mercy. Yet, according to the Mohammedan belief, God has no offspring: 'He begetteth not, nor is he begotten.' Nor is the Lord Jesus called anything more than a great prophet and apostle, though his birth is said to have been due to a miraculous divine operation; and as the Koran superseded the Gospel, so Mohammed, Christ. The crucifixion is said to have been executed upon another person, Christ having been taken up into God before the decree was carried out. He will come again upon the earth, to establish everywhere the Moslem religion, and to be a sign of the coming of the day of judgment. Next to the belief in God, that in angels forms a prominent dogma. Created of fire, and endowed with a kind of uncorporeal body, they stand between God and man, adoring or waiting upon the former, or interceding for and guarding the latter. The four chief angels are 'The Holy Spirit,' or 'Angel of Revelations'—Gabriel; the special protector and guardian of the Jews—Michael; the 'Angel of Death'—Azraël (Raphael, in the apocryphal gospel of Barnabas), and Israfíl—Uriel, whose office it will be to

sound the trumpet at the Resurrection. Most of Mohammed's 'religious' notions were taken almost bodily from the Jewish legends: his angelology, however, the Jews themselves had not received from their Scriptures, but had borrowed from the Persians, only altering the names, and, in a few cases, the offices of the chief angelic dignitaries (see ANGEL: ARCHANGEL). Besides angels, there are good and evil genii or Jinn (q.v.), the chief of the latter being Iblis (Despair), once called Azazil, who, refusing to pay homage to Adam, was rejected by God. These Jinn are of a grosser fabric than angels, and subject to death. They, too, have different names and offices (Peri, Fairies; Div, Giants; Takvíns, Fates, etc.), and are, in almost every respect, like the Shédim in the Talmud and Midrash. A further point of the system is the belief in certain Scriptures, revealed from God successively to the different prophets. Four only of the original 104 sacred books: viz., the Pentateuch, the Psalms, the Gospel, and the Koran, are said to have survived; the three former, however, in a mutilated and falsified condition. Besides these, a certain apocryphal gospel, attributed to St. Barnabas, and the writings of Daniel, together with those of a few other prophets, are noticed by the Moslems, but not as canonical books. The number of prophets, sent at various times, is stated variously at between two and three hundred thousand; among whom 313 were apostles, and six were specially commissioned to proclaim new laws and dispensations, which abrogated the preceding ones. These were Adam, Noah, Abraham, Moses, Jesus, and Mohammed—the last the greatest of them all, and the propagator of the final dispensation. The belief in the resurrection and the final judgment is the next article of faith. The dead are received in their graves by an angel announcing the coming of the two examiners, Monker and Nakîr, who put questions to the corpse respecting his belief in God and Mohammed, and who, in accordance with the answers, either torture or comfort him. This, again, is the Jewish 'Chibbut hakkeber,' the Beating of the Grave, a hyperbolical description of the sufferings during the intermediate state after death (purgatory). The soul, awaiting the general resurrection, enters according to its rank, either immediately into paradise (prophets), or partakes, in the shape of a green bird, of the delights of the abode of bliss (martyrs), or—in the case of common believers—is supposed either to stay near the grave, or to be with Adam in the lowest heaven, or to remain either in the well of Zem-Zem, or in the trumpet of the resurrection. According to others, it rests in the shape of a white bird under the throne of God. The souls of the infidels dwell in a certain well in the province of Hadramaut (Heb. Chambers of Death), or, being first offered to heaven, then offered to earth, and rejected by either, remain subject to unspeakable tortures until the day of resurrection. Concerning the latter, there is great discrepancy among the Mohammedan theologians. Mo-

hammed himself seems to have held that both soul and body will be raised, and the 'Bone Luz' of the Jewish Haggadah was by him transformed into the bone Al Ajb, the rumpbone, which will remain uncorrupted till the last day, and from which the whole body will spring anew, after a 40 days' rain. Among the signs by which the approach of the last day may be known—nearly all taken from the legendary part of the Talmud and Midrash, where the signs of the coming of the Messiah are enumerated—are the decay of faith among men, the advancing of the meanest persons to highest dignities, wars, seditions, and tumults, and consequent dire distress, so that a man passing another's grave shall say: 'Would to God I were in his place!' Certain provinces shall revolt, and the buildings of Medina shall reach to Yahâb. Again: the sun will rise in the west, the Beast will appear, Constantinople will be taken by the descendants of Isaac, the Anti-Christ will come, and be killed by Jesus at Lud. There will further take place a war with the Jews, Gog and Magog's (Jajug and Majuj's) eruption, a great smoke, an eclipse, the Mohammedans will return to idolatry, a great treasure will be found in the Euphrates, the Kaaba will be destroyed by the Ethiopians, beasts and inanimate things will speak, and finally, a wind will sweep away the souls of those who have faith, even if equal only to a grain of mustard seed, so that the world shall be left in ignorance. The time of the resurrection, even Mohammed could not learn from Gabriel: it is a mystery. Three blasts will announce it: that of consternation, of such terrible powers, that mothers shall neglect the babes on their breasts, and that heaven and earth will melt; that of exanimation, which will annihilate all things and beings, even the angel of death, save paradise and hell, and their inhabitants: and forty years later, that of resurrection, when all men, Mohammed first, shall have their souls breathed into their restored bodies, and will sleep in their sepulchres until the final doom has been passed upon them. The day of judgment, lasting from one to 50,000 years, will call up angels, genii, men, and animals. The trial over, the righteous will enter paradise, to the right hand, and the wicked will pass to the left, into hell; both, however, have first to go over the bridge Al Sirât, laid over the midst of hell, and finer than a hair, and sharper than the edge of a sword, and beset with thorns on either side. The righteous will proceed on their path with ease and swiftness, but the wicked will fall down headlong to hell below—a place divided into seven stories or apartments, respectively assigned to Mohammedans, Jews, Christians, Sabians, Magians, idolators, and—the lowest of all—to the hypocrites, who, outwardly professing a religion, in reality had none. The degrees of pain—chiefly consisting in intense heat and cold—vary; but the Mohammedans, and all those who professed the unity of God, will finally be released, while unbelievers and idolaters will be condemned to eternal punishment. Paradise is divided from hell by a parti-

tion (Orf), in which a certain number of half-saints will find place. The blessed, destined for the abodes of eternal delight (Jannat Aden, Heb. Gan Eden)—of which it is, however, not quite certain whether it is created already—will first drink of the Pond of the Prophet, which is supplied from the rivers of paradise, whiter than milk, and more odoriferous than musk. Arrived at one of the eight gates, they will be met by beautiful youths and angels; and their degree of righteousness (prophets, religious teachers, martyrs, common believers) will procure for them the corresponding degree of happiness. It is, however, the Mohammedan doctrine, that not a person's good works or merits will gain his admittance, but solely God's mercy; also that the poor will enter paradise 500 years before the rich; and that the majority of the inhabitants of hell are women. As to the various felicities which await the pious (and of which there are about a hundred degrees), they are a wild conglomeration of Jewish, Christian, Magian, and other fancies on the subject, to which the Prophet's own exceedingly sensual imagination has added considerably. Feasting in the most gorgeous and delicious variety, the most costly and brilliant garments, odors and music most ravishing, and above all, the enjoyment of the Hûr Al Oyûn, the black-eyed daughters of paradise, created of pure musk, and free from all the bodily weaknesses of the female sex, are held out as a reward to the commonest inhabitants of paradise, who will always remain in the full vigor of their youth and manhood.* For those deserving a higher degree of recompense, rewards will be prepared of a purely spiritual kind—i.e., the 'beholding of God's face' (Shechinah) by night and by day. A separate abode of happiness will also be reserved for women, but there is considerable doubt as to the manner of their enjoyment. That they are not of a prominently spiritual nature, is clear from the story of the Prophet and the old woman. The latter solicited Mohammed to intercede with God that she might be admitted into paradise, whereupon he replied that old women were not allowed in paradise, which dictum—causing her to weep—he further explained by saying that they would first be made young again. The last of the precepts of pure faith taught by Mohammedanism is the full and unconditional submis-

* 'The whole earth will be as one loaf of bread, which God will reach to them like a cake; for meat they will have the ox Balâm and the fish Nûn, the lobes of whose livers will suffice 70,000 men. Every believer will have 80,000 servants and 72 girls of paradise, besides his own former wives, if he should wish for these, and a large tent of pearls, jacinths, and emeralds: 300 dishes of gold shall be set before each guest at once, and the last morsel will be as grateful as the first. Wine will be permitted, and will flow copiously, without inebriating. The righteous will be clothed in the most precious silks and gold, and will be crowned with crowns of the most resplendent pearls and jewels. If they desire children, they shall beget them, and see them grow up within an hour. Besides the ravishing songs of the angel Israfil and the daughters of paradise, the very trees will, by the rustling of their boughs, the clanging of bells suspended from them, and the clashing of their fruits, which are pearls and emeralds, make sweetest music.'

sion to God's decree (ISLAM—see ISLAMISM), and the predestination of good and evil, which is found from the beginning inscribed on a 'preserved table.' Not only a man's fortunes, but his deeds, and consequently his future reward or punishment, are irrevocably, and thus unavoidably, pre-ordained (see FATE: FATALISM): a doctrine which is not, however, taken literally by *all* Moslems, but which has no doubt contributed largely to the success of Islam, by inspiring its champions with the greatest indifference and contempt for the dangers of warfare; their destiny being immutably fixed under any circumstances.

Thus far, briefly, the Iman, dogmatical or theoretical part of Islam. The Din, or practical part, which contains the ritual and moral laws, inculcates as the chief duties the following four: prayer, almsgiving, fasting, and pilgrimage.

Prayer, 'the key of paradise,' comprises also certain religious purifications, as the most necessary preparations to the former. They are of two kinds: the *Ghusl*, or total immersion of the body, required as a religious ceremony, on some special occasions; and the *Wudú*, a partial ablution, to be performed immediately before the prayer. This is of primary importance, and consists of the washing of hands, face, ears, and feet up to the ankles—a proceeding generally accompanied at each stage by corresponding pious sentences, and concluded by the recital of the 97th chapter of the Koran. In the case of water being beyond reach, dry dust or sand may supply its place. 'The practice of religion being founded on cleanliness,' it is not sufficient that the believer himself should be purified, but even the ground or the carpet upon which he prays must be as clean as possible, and the use of a special prayer-carpet (Seggadéh) is therefore recommended. Every Mohammedan is obliged to pray five times in every 24 hours. The prayer (Salah) itself consists partly of extracts from the Revealed Book, the Koran (Fard), partly of pieces ordained by the Prophet without allegation of a divine order (Sunnah—q.v.). The first time of prayer commences at the Maghrib, or about sunset; the second, at the Eshë, or nightfall; the third, at the Subh, or daybreak; the fourth, at the Duhr, or about noon; the fifth, at the Asr, or afternoon. The believers are not to commence their prayers exactly at sunrise, or noon, or sunset, lest they might be confounded with the infidel Sun-worshippers. These several times of prayer are announced by the Mnëzzins (q.v.) from the minarets or madnehs of the mosques. Their chant, sung to a very simple but solemn melody, sounds harmoniously and sonorously down the height of the mosque, through the midday din and roar of the cities, but its impression is most strikingly poetical in the stillness of night; so much so, that even many Europeans cannot help congratulating the Prophet on his preferring the human voice to either the Jewish trumpet-call of the time of the Temple, or the Christian church-bells. The day-call

(the Adan) consists chiefly of the confession of faith (God is most great—Mohammed is God's apostle—come to prayer, come to security) repeated several times; the night-calls (Ula, the first; Ebed, the second), destined for persons who desire to perform supererogatory acts of devotion, are much longer. The believer often changes his posture during his prayers; and a certain number of such inclinations of head and knees, prostrations, etc., is called a Rekah. It is also necessary that the face of the worshipper should be turned toward the Kibleh, in the direction of Mecca (q.v.), the exterior wall of the mosque marking that direction being distinguished by a niche (Mehrab). All sumptuous and pompous apparel is laid aside before the believer approaches the sacred place; and the extreme solemnity and decorum, the unaffected humility, the real and all-absorbing devotion which pervades it, have been often held up as an example to other creeds. Women, though not strictly forbidden to enter the mosque, yet are not practically allowed to pray there, lest their presence might be hurtful to true devotion. Besides these prayers, there are others ordained for special occasions, as on a pilgrimage, before a battle, at funerals, during an eclipse, etc. That the Moslems do not pray *to* Mohammed, but simply implore his intercession, as they do that of the numerous saints, the relatives of the Prophet, and the first propagators of Islam, need not be dwelt upon here (see MOHAMMED). For the particulars of the service in the Mosque, see MOSQUE. Mohammedanism has no clergy in our sense of the word, the civil and religious law being combined in one. See also MOLLAH: MUFTI.

Next in importance stands the duty of giving alms. These are twofold—legal (Zekah) and voluntary (Sadakah; Heb. Zedakah, piety, righteousness); but the former, formerly collected by the sovereign, and applied to pious uses, has now been practically abrogated. The Sadakah is, according to the law, to be given once every year, of cattle, money, corn, fruits, and wares sold, at about the rate of from two and a half up to twenty per cent. Besides these, it is usual to bestow a measure of provisions on the poor, at the end of the sacred month of Ramadán.

The duty of fasting follows (see FAST—*Fasting*). During the whole month of Ramadán, the Moslem is commanded to refrain from eating, drinking, smoking, smelling perfumes, bathing, and every unnecessary indulgence in worldly pleasure—from daybreak until sunset. From sunset till the morning, he is allowed to eat, drink, and enjoy himself. The Arabian year being lunar, it often happens that the Ramadán falls in midsummer, when the fasting, especially the abstaining from drinking, is excessively mortifying. None are exempt from this duty save the sick, travellers, and soldiers in time of war; but they are bound to fast an equal number of days during some other months. Nurses and pregnant women are entirely free from fasting. It is Mohammed's special and express desire, that no one should fast who is not quite equal to

it, lest he might injure his health, and disqualify himself for necessary labor. Of the other commendable fast-days, the Ashura, on the 10th of Moharram (the Jewish Jom Kippur), deserves special mention. There are very few Moslems who do not keep the Ramadán, even if they neglect their other religious duties; at all events, they all pretend to keep it most strictly, fasting being considered 'one-fourth part of the faith'—nay, 'the gate of religion.'

For the fourth paramount duty of the Mohammedan—the pilgrimage to Mecca—see MECCA: especially HAJJ. Suffice it here briefly to recapitulate, that the Kaaba (q.v.) is to be encompassed seven times, the celebrated black stone being kissed at each round, that Mount Arafat (q.v.) is to be visited, the sacrifice El-Fida (the Ransom, in memory of Ishmael's sacrifice) to be performed, and a number of minor ceremonies to be gone through by the pilgrim, and that he who neglects to perform the sacred pilgrimage 'might as well die a Jew or a Christian.'

To the 'positive' ordinances of Islam may be reckoned also the 'Saghir,' or minor, and 'Kebir,' or great, festivals (see FESTIVALS). The first (Al-Fetr, or breaking the fast), following immediately upon the Ramadán, begins on the first day of the month of Shawál, and lasts three days. The second (Eed Al-Kurban, or sacrifice) begins on the 10th of Dsu'l Heggeh, when the pilgrims perform their sacrifice, and lasts three or four days. Yet, though intended to be the most important of the two, the people have in most places changed the order, and, by way of compensation for the previous fast, they make the lesser festival which follows the Ramadán the most joyful and the longest of the two. The day set aside for the weekly day of rest is the Friday—not, as is generally supposed, because both the Jewish Sabbath and the Christian Lord's Day were to be avoided, but because, from times long before Mohammed, the Arabian people used to hold public assemblies for civil as well as religious purposes on that day. The celebration of the Moslem days of religious solemnity is far less strict than is the custom with the other Shemitic religions. Service being over, the people are allowed to return to their worldly affairs, if they cannot afford to give themselves up entirely to pleasure or devotion for the rest of the sacred period.

Thus far, briefly, the principal positive laws of Islam relating to faith and practice. We turn to the fundamental prohibitory laws contained in the Koran.

First of all, the drinking of wine, which includes all strong and inebriating liquors, as giving rise to 'more evil than good,' is rigorously forbidden; and though of late, chiefly through European influence, very many Moslems have lost their religious scruples on that score, and not only secretly, but openly, indulge in spirits, yet the great bulk of the faithful refuse even to make use of the proceeds of the sale of wine or grapes. Some over-scrupulous believers even include opium, coffee, and to-

bacco in the prohibition; but general practice has decided differently. The prohibitory laws respecting food resemble closely those of Judaism: blood, the flesh of swine, moreover animals which have died from disease or age, or on which the name of some idol has been invoked, or which have been sacrified unto an idol, or which have been strangled, or killed by a blow, a fall, or by some other beast, are strictly forbidden. 'Pure' animals must be slaughtered according to certain fixed rules, and the name of God is to be invoked before the operation, without, however, the usual addition of the benevolent epithets, since these would ill befit the sufferings of a fellow-creature. Fish, birds, game, are mostly allowed for food, yet there are in nearly all cases certain religious ceremonies to be observed, before they become fit for the believer's table.

All games subject to chance ('casting lots by arrows') —such as dice, cards, tables, bets, etc.—are considered so wicked, that a gambler's testimony is invalid in a court of law. (The Talmud rejects the testimony of only the habitual '*dice-*[Kubia—i.e., Cube] *gambler* and *better upon doves.*') Chess and other games depending on skill —provided they do not interfere with the regular performance of religious duties, and that they are played without any stakes whatsoever—are allowed by the majority of Moslem theologians. Usury is strictly prohibited. Taking interest on any loan, however large or small, or profiting in trade through any questionable means, save by buying and selling, is severely condemned.

To prevent the faithful from ever falling back into idolatry, the laws relating to images and pictures have been made very stringent. Whosoever makes an imitation of any living being in stone, wood, or any other material, shall, on the day of judgment, be asked to endow his creation with life and soul, and, on his protesting his inability of doing so, shall undergo the punishment of hell for a certain period.

The civil and criminal laws of Mohammedanism, founded both on the Koran and the Traditions (*Sunna*), are, in some instances, where the letter of the written or oral precept allows of various explanations, or where the case in question is not foreseen, interpreted according to the opinion of one of the four great masters of Islam, Abu Hanífa, Malec Ibn Ans, Sháfeï, Ibn Hanbal, within the pale of their respective sects. The principal points, however, on which all Mohammedans agree are the following: Polygamy is allowed, not, as is commonly supposed, without any restriction, but: 'Take in marriage, of the women who please you, two, three, or four; but if ye fear that ye cannot act equitably, one; or those whom your right hands have acquired'—i.e., your slaves. These are the explicit words of the Koran (iv. 3), so that four wives, and a certain number of concubine slaves, is the whole extent to which a Moslem may legally go. The Prophet's example proves nothing to the contrary,

since he was endowed with special privileges, and not subject to the common law in many respects. It is, moreover, added, as an advice, that to marry one or two is quite sufficient for a man, if he apprehend any inconvenience from a larger number of wives. A Moslem may, if urged by excessive love, or if unable to obtain a wife of his own creed, marry a Christian woman or a Jewess; but a Mohammedan woman is not, under any circumstances, to marry an unbeliever. In all cases, however, the child born of a Moslem, whatever the mother's faith, is a Moslem; nor does the wife who is an unbeliever inherit at her husband's death. Forbidden degrees of consanguinity, etc., in marriage are: the mother, daughter, sister, half-sister, aunt, niece, foster-mother, or a woman related to the faithful 'by milk in any of the degrees which would preclude his marriage with her, if she were similarly related to him by consanguinity;' the mother of his wife, even if he be not properly married to the latter yet; the daughter of his wife, if the latter still be his legal wife; his father's wife and his son's wife; or two sisters at the same time; or wives who stand to each other in the relation of aunt and niece; or the unemancipated slave, or another man's slave, if he have already a free wife. A simple declaration of a man and woman at the age of puberty, before two witnesses, of their intention to marry each other, and the payment of part of the dowry (which is indispensable, and must amount to at least ten dirhems, or about five shillings = about $1.25), is sufficient for a legal marriage. A girl under age is given away by her natural or appointed guardian, with or without her consent. To see the face of any woman who is neither his wife nor his concubine, nor belongs to any of the forbidden degrees, is strictly forbidden to the believer. Divorce is a comparatively light matter with the Mohammedans. Twice, a man may send away his wife and take her back again without any ceremony; the third time, however—if he unite the triple divorce in one sentence at once—he dare not receive her again in wedlock until she have been married properly to another man in the mean time. Mere dislike is sufficient reason for a man to dissolve the conjugal ties, and his saying: 'Thou art divorced,' or 'I divorce thee,' together with the payment of part of the wife's dowry, is all that is required from him by the law. A wife, on the other hand, is bound to her husband forever, unless she can prove some flagrant ill-usage or neglect of conjugal duty on his part; and even then, she forfeits part, or the whole, of her dowry. A divorced woman is obliged to wait, like a widow, for a certain period before marrying again: if pregnant, until delivery; three months, or four months and ten days, according to circumstances. If she have a young child, she is to suckle it until it be two years old, and the father is to bear all the expenses of the maintenance of mother and child. A woman proving disobedient to her husband may be declared by the kadi 'náshizeh'—i.e., rebellious, and the husband is no longer

bound to maintain her. Yet, he cannot be forced to divorce her under these circumstances, so that the woman is generally in so sore a plight that she is obliged to promise good behavior for the future, and the husband has then either to take her back to his house, or to set her free by a formal divorce. On the other hand, it often happens that a woman prefers a mere separation, to continuing to live with her husband; in which case she gets herself, of her own accord, inscribed a 'náshizeh.' If a slave becomes a mother by her master, and he acknowledges the child to be his own, the child is free, and the mother is to be emancipated at the master's death, and may not be given away, or otherwise disposed of by him, during his lifetime. A free person, wishing to marry his or her slave, must first emancipate this slave; and if the slave of another person has been married by a free man or woman, and afterward becomes the latter's property, the marriage becomes illegal, and can be renewed only by a legal contract and emancipation.

The privilege of primogeniture does not exist in the Mohammedan law, but males generally receive a double share. A person may not bequeath more than one-third of his property, unless there be no legal heirs. Children, whether begotten with the legal wife, or slave, or concubine, or only adopted, and their descendants, are the first heirs; next come the claims of wives, parents, brothers, sisters, in their order. Where there is no legal heir, the property falls to the crown.

The law is very lenient toward debtors, the Koran recommending the creditor to remit a debt 'as alms.' Insolvency, and inability to work for the discharge of the claim, solve all further obligations. The most conscientious performance of all private contracts, however, is constantly recommended in the Koran.

Murder is punished either with death, or by the payment of a fine to the family of the deceased, according to their own pleasure. There must, however, be palliating circumstances in the latter case. The Bedawis, however, have expanded the law of blood-revenge in a terrible manner, and up to this day the 'vendetta' often rages not only between family and family, but between whole tribes, villages, and provinces. Unintentional homicide is expiated by freeing a believer from slavery, and paying to the family a certain sum in proportion to the rank and sex of the deceased. He who has not the means of freeing a believer is to fast for two months, by way of penance. According to the strict letter of the law, a man is not liable to capital punishment for killing his own child or an infidel; but, practically, no difference is generally made by the Mohammedan governments (chiefly the Turkish) in our day. Murder is punished with death, and no fine frees the culprit.

The Mosaic law of retaliation, in case of *intentional* wounds and mutilation, holds good also for Islam—that is (not, as has ignorantly been supposed, that the corresponding limb of the offender is to be cut off), a certain

proportionate fine in money is to be paid to the injured. The payment for any of the single limbs of the human body—e.g., the nose—is the full price of blood, as for a homicide; for a limb which is found twice, like hand or foot, half; for a finger or toe, the tenth part, etc. Women and slaves have smaller claims. Injuries of a dangerous or otherwise grievous nature pay the full price; those of an inferior kind, however, bring the perpetrator within the province of the lash or cudgel, which is supposed to have 'come down from heaven, to be used by the judge for the promotion of virtue and duty.'

The Koran orders theft—of no less than the value of half-a-crown—to be punished by cutting off the chief offending limb, the right hand; the second theft is punishable by the loss of the left foot; the third, of the left hand; the fourth, of the right foot, etc.; but the ordinary punishments of imprisonment, hard labor, and the bastinado, have been substituted in our days. The property stolen must not, however, have been of easy access to the thief, nor must it have consisted of food, since he may have taken this to satisfy his hunger.

Unchastity in woman was, in the commencement of Islam, punished by imprisonment for life, for which afterward stoning was substituted in the case of a married woman, and a hundred stripes and a year's exile in the case of an unmarried free woman; a slave to undergo only half of that punishment. Yet, it is necessary that he who accuses a 'woman of reputation' of adultery or fornication shall produce four (male) witnesses, and if he be not able to do so, he is to receive fourscore stripes, nor is his testimony ever after to be received, for he is considered an 'infamous prevaricator'—unless he swear four times that he speaks the truth, and the fifth time imprecate God's vengeance if he speak false. Yet, even this testimony may be overthrown by the wife's swearing four times that he is a liar, and imprecating the fifth time the wrath of God upon herself, if he speak the truth. In the latter case, she is free from punishment; the marriage, however, is to be dissolved. Fornication in either sex is, by the law of the Koran, to be visited with a hundred stripes.

Infidelity, or apostasy from Islam, is a crime to be visited by the death of the offender, if he have been warned thrice without recanting. Severer still—that is, not to be averted by repentance or revocation of any kind, is the punishment inflicted for blasphemy—against God, Mohammed, Christ, Moses, or any other prophet. Instantaneous death is the doom of the offender; for if apostasy may be caused by error and misguidance, 'blasphemy is the sign of complete wickedness and thorough corruption of the soul.'

A further injunction of the Koran, for the carrying out of which, however, the time has nearly gone by, is that of making war against the Infidels. He who is slain while fighting in defense and for the propagation of Islam is reckoned a martyr; while a deserter from the

holy war is held up as an object of execration, and has forfeited his life in this world as well as in the world to come. At first, all the enemies taken in battle were ruthlessly slain; later, it became the law to give the people of a different faith against whom war was declared the choice of three things: either to embrace Islam—in which case they became Moslems at once, free in their persons and fortunes, and entitled to all the privileges of Moslems; or to submit to pay tribute—in which case they were allowed to continue in their religion, if it did not imply gross idolatry or otherwise offended against the moral law; or to decide the quarrel by the fortune of war—in which case the captive women and children were made slaves, and the men either slain, unless they became converts at the last moment, or otherwise disposed of by the prince. The fifth part of the spoil belongs 'to God'—that is, the Sanctuary (Kaaba, etc.)—to the apostle and his kindred, to the orphans, the poor, and the traveller.

It is to be noted that the Koran is not a systematically arranged code, and that all the laws and regulations above enumerated, though contained in it, either bodily or, as it were, in germs—further developed by the Sunna (q.v.)—are to a great extent only mentioned in an incidental manner, thrown together and mixed up, often in the strangest manner, with the most heterogeneous dicta, dogmas, moral exhortations, civil and criminal laws, etc., and are to be considered principally as supplementary to the existing laws and regulations, which they either abrogated, confirmed, or extended, according to the pressing demand of circumstances during the Prophet's life. In cases for which subsequent ages found no written rules laid down by the Prophet, traditional oral dicta were taken as the norm, and, later still, precedents of the Khalifs were binding. Hence contradictions in theory and practice have crept in, according to the different traditions and decisions of the Imams or expounders of the Law, besides the various interpretations put on the book itself within the pale of the different Mohammedan sects. The secular tribunals, therefore, frequently differ in their decisions from the judicial tribunals; and the distinction between the written civil Law of the ecclesiastical courts and the common Law, aided by the executive power, is, fortunately for justice and civilization, becoming clearer every day.

That part of Islam, however, which has undergone (because not to be circumscribed and defined by doctors) the least changes in the course of time, and which most distinctly reveals the mind of its author, is also its most complete and its most shining part—we mean the ethics of the Koran. They are not found, any more than the other laws, brought together in one, or two, or three Surahs, but 'like golden threads' they are woven into the huge fabric of the religious constitution of Mohammed. Injustice, falsehood, pride, revengefulness, calumny, mockery, avarice, prodigality, debauchery, mis-

trust, and suspicion are inveighed against as ungodly and wicked; while benevolence, liberality, modesty, forbearance, patience and endurance, frugality, sincerity, straightforwardness, decency, love of peace and truth, and, above all, trusting in God, and submitting to His will, are considered as the pillars of true piety, and the principal signs of a true believer. Mohammed never taught that form of the doctrine of absolute predestination and 'fatality' which destroys all human will and freedom by teaching that the individual's deeds cannot alter one iota in his destiny either in this world or in the next. On the contrary, foolhardiness is distinctly prohibited in the Koran (ii. 196): caution is recommended: prayer, the highest ceremonial law of Islam, is modified in case of danger: it is legal to earn one's livelihood on Friday after prayer, and to shorten the readings in the Koran for the sake of attending to business. These instances show that the Moslem is not to expect to be fed pursuant to a Divine decree, whether he be idle or not. On the other hand, a glance at the whole system of faith, built on hope and fear, rewards and punishments, paradise and hell, both to be man's portion according to his acts in this life, and the incessant exhortations to virtue, and denunciations of vice, are sufficient to prove that aboriginal predestination, such as St. Augustine taught, is not in the Koran, where only submission to God's will, hope during misfortune, modesty in prosperity, and entire confidence in the Divine plans, are supported by the argument, that everything is in the hands of the Highest Being, and that there is no appeal against His absolute decrees.

And this is one instance of the way in which most of Mohammed's dicta have been developed and explained—both by sectarians and enemies within and without Islam—in such a manner that he has often been made to teach the very reverse of what he really did teach; and thus monstrosities now found in his creed, if carefully traced back to their original sources, will, in most cases, be seen to be the growth of later generations, or the very things that he abrogated. That, again, the worst side of his character, the often wanton cruelty with which he pursued his great mission, the propagation of his faith, should by his successors have been taken as a thing to be principally imitated, is not to be wondered at, considering the brilliant success which attended his policy of the bloody sword. Scarcely a century had elapsed after Mohammed's death before Islam reigned supreme over Arabia, Syria, Persia, Egypt, the whole of the n. coast of Africa, even as far as Spain; and notwithstanding the subsequent strifes and divisions in the interior of this gigantic realm, it grew and grew outwardly, until the Crescent was made to gleam from the spires of St. Sophia at Constantinople, and the war-cry 'Allah il Allah!' resounded before the gates of Vienna. From that time, however, the splendor and the power of Mohammedanism began to wane. Although

there are counted about 130 millions this day all over the globe who profess Islam, and although it is, especially at this present juncture, making great progress among the African races, yet the number of real and thorough believers is infinitely small; and since it has left off conquering, it has lost also that energy and elasticity which promises great things.

We cannot consider in this place what Islam has done for the general good of the race, or, more exactly, what was its precise share in the development of science and art in Europe. (See the special titles relative to these subjects—especially the biographical titles referring to men eminent in every branch of human knowledge who have issued from the ranks of Islam.)

Besides the Koran, the Sunna, and the native (Arabic, Persian, Turkish, etc.) writers on the foregoing subject, see, further, the works of the European scholars Marracci, Hyde, Prideaux, Chardin, Du Ryer, Reland, D'Herbelot, Sale, De Sacy, Hammer, Burckhardt, Sprenger, Burton, Muir, Garcin de Tassy, Lane, Weil, Geiger, Nöldeke.—See CALIPH: KORAN: MOHAMMED: MOHAMMEDAN LITERATURE: MOHAMMEDAN SECTS: SHIITES: SUNNA.

MOHAMMEDAN LITERATURE, more correctly Moslem Literature. The oldest specimens of Arabic literature now extant were composed in the century which preceded the birth of Mohammed. They were, for the most part, short extemporaneous elegies written in rhythmical prose, similar to that which we find in the Koran. The appearance of the Koran brought about a change in tone and spirit, and the assertion that it was the uncreated and eternal word of Allah deterred attempts at imitation. But as Moslems, in all ages, have drawn their principles of grammar and rhetoric from the Koran, it must be considered the foundation of Mohammedan literature. (See KORAN.) The English translations of the book are: Sale's (A.D. 1760); Rodwell's, with the suras arranged in chronological order (1861); Palmer's (1880). Arabic commentaries on the Koran form an important branch of Moslem literature. In the library at Tripolis there are not less than 20,000 volumes of these works. The most celebrated are the *Baghawi* (A.H. 515); the *Tafsīr-ul-Kabīr* (A.H. 606); the *Baizāwi* (A.H. 685); and the *Jalalain* (A.H. 864). Among the Shiahs there are many commentaries of reputation, the earliest being that by *Shaikh Saduk* (A.H. 381).

The Traditions (Arabic *Hadīth*, or *Hadīs*, lit. 'a saying').—The Koran is not, as is sometimes asserted, the only foundation of the Moslem religion, for the Prophet propounded the dogma that that which he said and did, and also that which he refrained from saying and doing, on questions of doctrine and rules of life, were the result of divine inspiration and guidance. These have been incorporated in many volumes and are

known as the 'Hadith.' Among the Sunnis there are six volumes called the 'Siha-us-Sittah' or 'six correct' books. Namely, *Bukhāri* (A.H. 256); *Moslem* (A.H. 261); *Tirmizi* (A.H. 279); *Abu Daud* (A.H. 275); *Nasai* (A.H. 303); *Ibn Mājah* (A.H. 273). The Shiahs do not reject the traditions, as is frequently asserted, but they have five collections of their own, namely, the *Kāfi* (A.H. 329); the *Fakīh* (A.H. 381); the *Tahzib* (A.H. 466); the *Istifsār* (A.H. 468); the *Balāgah* (A.H. 406). The Wahhābis, as a rule, reject the traditions (see WAHHABI). When Ismail al-Bukhāri determined to make a careful collection of the traditional acts and sayings of the Prophet he found not fewer than 300,000 extant, from which he selected only 7,275, and it is said that he recorded each of these traditions after making prostrations in prayer and seeking divine guidance. The only English translation of selections from these traditions of the Sunnis is Matthew's translation of the *Mishkāt* (A.D. 1809), a work originally compiled by Baghawi, the celebrated commentator.

Theology.—The theological works embrace many thousands of volumes in Arabic and Persian, for while in the progress of centuries an overwhelming number of theological works were written, they are now sent forth in still greater numbers from the lithographic printing presses of the East. These theological works consist of: 1. Commentaries on the Koran. 2. Commentaries on the Traditions. 3. The exegesis of the Koran and the Traditions. 4. Law, moral, civil, and ceremonial. 5. Scholastic theology founded on the six articles of the Moslem creed. 6. Sufiism, or the mystic teachings of the religious orders. (See SUFI.)

Jurisprudence.—The principles of civil law are very carefully outlined and defined. Among the Sunnis there are four schools of interpretation of civil law, namely, *Hanīfah Shāfii, Mālik,* and *Hambal.* The Hidāyah, which is the standard work of the Sunnis was translated into English by Hamilton (A.D. 1791). There is a Digest of the Hanifia code, and also a Digest of the Imāmeea code by Bailie 1869, and there are other English translations of various sections of the Moslem law, such as inheritance, sale, divorce, etc.

History.—In the 7th c. of the Christian era the Caliph of Islam is said to have destroyed the Alexandrian, and other libraries, but in the middle of the 8th c. the Abbaside caliphs at Kufa, and afterwards at Baghdad became magnificent patrons of literature. When the Moors conquered the cities of the West and came into possession of the richest legacies of intellectual wealth they used them in such a manner as to earn for themselves the most prominent place in history as patrons of learning, for if they did not produce many original works in science, philosophy, and art they certainly had the energy to translate the works of Greece and Rome into what was considered the 'god-sent

tongue' of the Koran, but unfortunately they destroyed the originals. Mansur, the Abbaside caliph (A.H. 136), was a great patron of learning, and Harun-ar-Rashīd (A.H. 170), the hero of the Arabian Knights, surrounded himself with eminent scholars. The reign of Mamun (A.H. 198) has been designated the Augustine period of Mohammedan literature. Baghdad was then the resort of poets, philosophers, and historians of every country and creed. Under the Fatimide caliphs (A.D. 910 to 1171), Egypt, for a second time in its history, became the asylum of literature. Alexandria had more than 20 schools of learning, and Cairo, which was founded A.D. 955, possessed a royal library of 100,000 manuscripts. During the Moslem occupation of Spain, which lasted for 7 centuries, from A.D. 711 to 1492, the cities of Cordova, Seville, and Granada rivalled each other in the reputation of their scholars and in the magnificence of their schools of learning.

Moslem history naturally begins with the life of the Prophet. The earliest historian of the Prophet of whom we have any record is Ibn Ishāk, who died A.H. 151. Other historians of eminence are Ibn Hishām, Ibn Saad, the secretary of Al-Wakidi, and at-Tabri, who flourished in the latter part of the 3d c. of the Moslem era, and who has been styled by Gibbon the 'Livy of the Arabians.' He compiled not only the annals of the Prophet's life but a history of Islam under the earlier caliph. Ibn Husain, of Cordova, wrote a history of Islam, and it is said that his writings contained as many as 160,000 folio pages. The most complete lives of Mohammed in English are by Sprenger (1851), Muir (1858), Margoliouth (1905).

Biography.—Moslem literature is specially rich in biographical dictionaries. They are very numerous, both in Arabic and Persian. The most celebrated is that by Ibn Khallikan, who died A.D. 1282, and which is translated into English by De Slane, 1842. The Kashf-uz-Zunun gives a list of 1,300 chronicles and memoirs.

Logic.—The Mohammedans being suddenly called from the deserts of Arabia to the duties of civilized life found it necessary to reconcile the simplicity of the precepts of their Prophet with their new surroundings, and they were obliged to give the study of dialectics an importance in their religious system. *Ilm-ul-Mantik*, 'the science of rational speech,' was taught and is still taught in all the schools. Hanifah, the head of the great school of jurisprudence, was such a master of logic that Ibn Mālik declared that if he were to assert that a pillar of wood was made of gold he would undoubtedly prove it. Greek works on logic were translated into Arabic by the order of the Caliph Mamun A.H. 198. Arabic treatises on logic have been translated into English by the Bengal Asiatic Society.

Philosophy.—Arabic *falsafah* or *Ilm-ul-Hikmah*. The

philosophy of the Arabians was only a form of Aristotelianism, tempered more or less with Platonic conceptions. Of the Moslem philosophers in the East the most important were Alkendi (*al-Kindi*), *Alfarabi* (*al-Farābi*), who adopted the Neo-Platonic doctrine of emanation, Avicenna (*Abu-Sina*) of Bokhara, the representative of a purer Aristotelianism, and al-Ghazzali, of Naisapur, who maintained a philosophical scepticism in the interests of theological orthodoxy. In the West were Avempace (*Ibn Baja*), Abu Bacer (*Abu Bakr*), and Averroes (*Ibn Rashīd*). Avempace and Abu Bacer dwell in their works on the idea of the independent and gradual development of man. Averroes was a celebrated commentator of Aristotle. (See Ueberweg's *History of Philosophy*, translated into English by Morris.)

Poetry.—The Prophet of Arabia repudiated the idea of being a poet. 'This is not the speech of a poet,' he wrote in the Koran. But poetry has always been a favorite occupation of the Moslem in the East. Scholars classify the Arabic poets into 6 periods, and De Slane in his English introduction to Ibn Khallikan gives an interesting account of the poets of Arabia. The English translation of the Rubiyāt of Omar Khayām is well known, and there are also English translations of other Persian poets, including Hāfiz, Sādi, Firdausi, Nizāmi, Rumi, and Jāmi. (See PERSIA.)

Medicine.—Although the only medicine recommended in the Koran is honey, Moslems have always paid particular attention to the study of medicine, and many of our modern pharmaceutical terms, such as camphor, jalap, and syrup are of Arabic origin. But the superstitious feelings of Moslems debarred them from the study of anatomy and surgery. The doctrine that even at death the soul does not depart from the body, and the popular belief that the body will appear with the soul in Paradise, were reasons why the dissection of the dead body should not be attempted. Operation for cateract in the eye was a Moslem practice, and the philosopher Avecenna wrote in defense of depression instead of extraction. Botany, as a subsidiary to medicine, was studied in the East in all ages, and the Saracens are credited with having discovered several herbal remedies which were not known to the Greeks. The first great Arabic writer on chemistry was Jabar, of Mesopotamia, who lived only a century and a half from the flight of Mohammed, and is credited with the authorship of 500 works, and to have discovered sulphuric and nitric acids. We owe to the Arabs the terms alcohol, alkali, and many other words in chemistry.

Astronomy.—The science of astronomy was necessary for the study of astrology, and was cultivated with great zeal. The Caliph Mamun was an astronomer. But not a single step was made towards the discovery of the solar system beyond the hypothesis of Ptolemy.

The Saracens are said to have been the first to introduce observatories. The one erected by Jabir (A.D. 1196), at Seville, may still be seen.

Geography.—The study of geography was not neglected, and it is said that the royal library at Cairo had two massive globes. But the statements of Moslem writers on geographical discoveries are the creations of Eastern fancy. A circle of mountains called Kāf is supposed to compass the earth and to be inhabited by demons and genii. This mountain range is said to be of emerald which gives an azure hue to the sky!

The Sciences.—There is a very important Arabic work named 'Mafatih-ul-Ulum,' by Abu Abdullah, written somewhere about A.D. 975, which is, as its title indicates, 'the keys of the sciences,' and which in a small compass gives a conspectus of the sciences, both indigenous and foreign, known to the Mohammedans in the 10th c. of the Christian era, including philosophy, logic, medicine, arithmetic, algebra, geometry, astronomy, music, mechanics, alchemy, jurisprudence, history, grammar, and poetry.

Lexicons.—Moslem literature embraces a very large number of Arabic and Persian lexicons. Mr. Lane says that the Sihah, compiled by Jauhari in the 4th c. of the Moslem era, is pre-eminent among the lexicons of the ages. There are two well-known dictionaries in Arabic and Persian, compiled in modern times, and known as the Ghiyas-ul-Lughat and the Muntah-al-Arab. The Arabic and English dictionaries now extant are by Richardson, Lane, Badger, and Steingass, with several smaller works.

For an account of the state of literature in Spain under the Moors the English reader can refer to de Gayango's translation of al Makkara's *History* (London, 1840); *A Literary History of Persia*, by Prof. Browne of Cambridge, (England, 1902); and Gosse's translation of *A History of Arabic Literature*, by Clement Huart (New York, 1903), are most comprehensive.

MOHAM'MEDAN SECTS: divisions among those professing the faith of Islam. 'My community,' Mohammed is reported to have said, 'will separate itself into 73 sects; one only will be saved, all the others shall perish.' This prophecy has been largely fulfilled. Even during the illness, and immediately after the death of the founder, many differences of opinion arose among his earliest adherents. The fundamental book of Islam left certain points undecided by the very fact of its poetical wording (see KORAN: MOHAMMEDANISM); and further, the peculiarity of the Arabic idiom at times allowed many interpretations to be put on one cardinal and dogmatic sentence. To add to this uncertainty, a vast number of oral traditions sprang up and circulated as an expansive corollary to the Koran. Political causes soon came to assist the confusion and contest, and religion

was made the pretext for faction-fights, which in reality had their origin in the ambition of certain men of influence. Thus 'sects' increased in far larger numbers even than the Prophet had foretold, and though their existence was short-lived in most instances, they yet deserve attention, if only as signs and tokens of mental activity, which, though fettered a thousand times by narrow and hard formulas, will break these fetters a thousand times, and prove its everlasting right to freedom of thought and action. These sects are notable as tokens also of the inherently divisive and schismatic effect of theology when it is taken as the substance or the chief aim of a religion.

The bewildering mass of these controversies largely theological or philosophical, has by the Arabic historians been brought under four chief heads or fundamental bases. The first of these relates to the divine attributes and unity. Which of these attributes are essential or eternal? Is the omnipotence of God absolute? If not, what are its limits? The second relates to the doctrine of God's predestination and man's liberty—a question of no small purport, and one which has been controverted in nearly all 'revealed' religions—How far is God's decree influenced by man's own will? How far can God countenance evil? and questions of a similar kind belonging to this province. The third is perhaps the most comprehensive 'basis,' and the one that bears most directly upon practical doctrines—viz., the promises and threats, and the names of God, together with various other questions relating chiefly to faith, repentance, infidelity, and error. The fourth concerns itself with the influence of reason and history on the transcendental realm of faith: To this head belong the mission of prophets, the office of Imam, or Head of the Church, and such intricate subtleties as to what constitutes goodness and badness; how far actions are to be condemned on the ground of reason or the 'Law;' etc.

One broad line, however, came to be drawn, in the course of time, among these innumerable religious divisions, a line that separated them all into orthodox sects and heterodox sects; orthodox being those only who adopted the oral traditions, or Sunna (see SUNNITES).

Much more numerous than the orthodox divisions are the heterodox ones. Immediately after Mohammed's death, and during the early conquests, the contest was chiefly confined to the question of the Imamat. But no sooner were the first days of warfare over, than thinking minds began to direct themselves to a closer examination of the faith itself, for which and through which the world was to be conquered, and to the book which contained it, the Koran. The earliest germs of a religious dissension are found in the revolt of the Kharejites against Ali, in the 37th year of the Hedjrah (A.D. 659); and several doctors shortly afterward broached heterodox opinions about predestination and the good and evil to be ascribed to God. These new doctrines were boldly, and in a very advanced form, openly preached by Wâsil Ibn

Atâ, who, for uttering a moderate opinion in the matter of the 'sinner,' had been expelled from the rigorous school of Basra. He then formed a school of his own—that of the Separatists or Motazilites (q.v.), who, with a number of other 'heretical' groups, are variously counted as one, four, or seven sects.

The second great heretic group, the Sefatians (attributionists) held a precisely contrary view to that of the Motazilites. With them, God's attributes, whether essential or operative, or what they afterward called declarative or historical, i.e., used in historical narration (eyes, face, hand), anthropomorphisms, in fact, were considered eternal. But here, again, lay the germs for more dissensions and more sects in their own body. Some taking this notion of God's attributes in a strictly literal sense, assumed a likeness between God and created things; others giving it a more allegorical interpretation, without, however, entering into any particulars beyond the reiterated doctrine, that God had no companion or similitude. The different sects into which they split were, first, the Asharians, so called from Abul Hasan al Ashari, who, at first a Motazilite, disagreed with his masters on the point of God's being bound to do always that which is best. He became the founder of a new school, which held (1) that God's attributes are to be held distinct from His essence, and that any literal understanding of the words that stand for God's limbs in the Koran is reprehensible. (2) That predestination must be taken in its most literal meaning, i.e., that God preordains everything. The opinions on this point of man's free will are, however, much divided, as indeed to combine a predestination which ordains every act with man's free choice is not easy; and the older authors held it is well not to inquire too minutely into these things, lest all precepts, both positive and negative, be argued away. The middle path, adopted by the greater number of the doctors, is expressed in this formula: There is neither compulsion nor full liberty, but the way lies between the two; the power and will both being created by God, though the merit or guilt be imputed to man. Regarding mortal sin, it was held by this sect, that if a believer die guilty of it without repentance, he will not, for all that, always remain a denizen of hell: either God will pardon him, or the Prophet will intercede on his behalf, as he says in the Koran: 'My intercession shall be employed for those among my people who shall have been guilty of grievous crimes;' and further, that he in whose heart there is faith but of the weight of an ant, shall be delivered from hell-fire. From this more philosophical opinion, however, departed a number of other Sefatian sects, who, taking the Koranic words more literally, transformed God's attributes into grossly corporeal things, like the Mosshabehites, or Assimilators, who conceived God to be a figure composed of limbs like those of created beings, either of a bodily or spiritual nature, capable of local motion, ascent, or descent, etc. The

notions of some actually went so far as to declare God to be 'hollow from the crown of the head to the breast, and solid from the breast downward; he also had black curled hair.' Another sub-division of this sect were the Jabarians, who deny to man all free agency, and make all his deeds dependent on God. Their name indicates their religious tendency, meaning 'Necessitarians.'

The third principal division of 'heretical sects' is formed by the Kharejites, or 'Rebels' from the lawful prince—i.e., Ali—the first of whom were the 12,000 men who fell away from him after having fought under him at the battle of Seffein, taking offense at his submitting the decision of his right to the caliphate (against Moawiyyah) to arbitration. Their 'heresy' consisted, first, in their holding that any man might be called to the Imamat though he did not belong to the Koreish, nor was even a freeman, provided he was a just and pious man, and fit in every other respect. It also followed that an unrighteous Imam might be deposed, or even put to death; and further, that there was no absolute necessity for any Imam in the world.

For the fourth principal sect, the Shiites, or 'Sectaries,' followers of Ali Ibn Abi Tâleb, see SHIITES.

It remains only to mention a few of the many pseudo-prophets who arose from time to time in the bosom of Islam, drawing adherents around them, and threatening to undermine the church founded by Mohammed, by either declaring themselves his legal successors, or completely renouncing his doctrines. The first, and most prominent, was Mosaylima (q.v.). Next stands Al-Aswad, originally called Aihala, of the tribe of Ans, of which, as well as of that of a number of other tribes, he was governor. He pretended to receive certain revelations from two angels, Sohaik and Shoraik. Certain feats of legerdemain, and a natural eloquence, procured him followers, by whose aid he made himself master of several provinces. A counter-revolution, however, broke out the night before Mohammed's death, and Al-Aswad's head was cut off; whereby an end was put to a rebellion of exactly four months' duration, but already assuming large proportions. In the same year, 11 Hedjrah (A.D. 633), but after Mohammed's death, a man named Toleiha set up as prophet, but with very little success. He, his tribe, and followers were met in open battle by Khalid, at the head of the troops of the Faithful, and being beaten, they all finally submitted to Islam.

A few words ought also to be said regarding the 'Veiled Prophet,' Al-Mokanna, or Borkai, whose real name was Hakim Ibn Hashem or Hakim-ben-Allah (q.v.), at the time of Al-Mohdi, third Abbaside caliph. He used to hide the deformity of his face (he had also but one eye) by a gilded mask; which his followers explained by the splendor of his countenance being too brilliant (like that of Moses) to be borne by ordinary mortals. Being a proficient in jugglery besides, which went for the power of working miracles, he soon drew many followers.

At last he arrogated the office of the Deity itself, which by continual transmigrations from Adam downward, had come to reside in the body of Abu Moslem, governor of Khorassan, whose secretary this new prophet had been. The caliph, finding him growing more and more formidable every day, sent a force against him, which finally drove him back into one of his strongest fortresses, where, as the story is, he first poisoned and then burned all his family; after which he threw himself into the flames, which consumed him completely, except his hair. He had left a message, however, to the effect that he would reappear in the shape of a gray man riding on a gray beast, and many of his followers for many years expected his reappearance. They wore, as a distinguishing mark, nothing but white garments. He died about the middle of the 2d c. Hedjrah.

For the Karmathians and the Ismaïlis, see those titles. We can scarcely enumerate among the prophets Abul Teyeb Ahmed Al-Motanebbi, one of the most celebrated Arabic poets, who mistook, or pretended to mistake, his poetical inspirations for the divine afflatus, and caused several tribes to style him prophet, as his surname indicates, and to acknowledge his mission. The gov. of his province, Lûlû, took the promptest steps to stifle any such pretensions in the bud, by imprisoning him, and making him formally renounce all absurd pretensions to a prophetical office. The poet did so with all speed. He was richly rewarded by the court and many princes for his minstrelsy, to which henceforth he clung exclusively; but the riches he thus accumulated became the cause of his death. Robbers attacked him while he was returning to his home in Kufa, there to live on the treasure bestowed upon him by Adado'ddawla, Sultan of Persia. —The last of these new prophets to be mentioned is Baba, who appeared in Amasia, in Natolia, in 638 Hedjrah (A.D. 1260), and who had immense success, chiefly with the Turkmâns, his own nation, so that at last he found himself at the head of nearly a million men, horse and foot. Their war-cry was, God is God, and Baba—not Mohammed—is his prophet. It was not until both Christians and Mohammedans combined against him for self-defense, that this new and formidable power was annihilated, its armies being routed and put to the sword, while the two chiefs were decapitated by the executioner.

MOHA'VE DESERT: see AMERICA.

MOHAWK, n. *mō'hawk*, or MOHOCK [from an Amer. Indian tribe of that name]: at the beginning of the 18th c., a name applied to a class of ruffians in London who prowled about at night committing outrages.

MO'HAWK RIVER: stream in e. N. Y., named from a tribe of Indians. It rises in Oneida co., and flows eastward into the Hudson at Waterford, 10 m. above Albany. It is 135 m. long, and has numerous and picturesque waterfalls, especially at Little Falls, Cohoes, and Waterford, affording abundant water-power.

MOHAWKS, *mō′hawks*, or Mo′hawk Indians: tribe of the Iroquois: see Indians, American.

MOHICANS, *mō-hē′kanz*, or Mohegans, *mō-hē′ganz*, or Mahicanni: formerly a powerful and warlike subtribe of N. Amer. Indians, of the great Algonquin family, which, in the 17th c., inhabited the territory n.n.w. of Long Island Sound, and e. of the Hudson river, now included in the states of New York, Connecticut, and Massachusetts. Being compelled to give way to the conquering Iroquois confederacy, they retired to the valley of the Housatonic river in Conn., and were consequently one of the first tribes who came into collision with, and were dispossessed of their territory by the early British settlers. They subsequently lived dispersed among the other tribes, and nearly all traces of them have now disappeared. Their name has become widely known through J. Fenimore Cooper's celebrated novel, *The Last of the Mohicans.*

MOHILEV, or Mogilev, *mo-ċhē′lĕv:* government of European Russia, between Minsk and Smolensk; 18,500 English sq. m. The inhabitants are mostly Rusniaks, though there are also many Russians, Germans, Jews, and even Bohemians. The country is generally a plain, with occasional undulation; the soil is very fertile, and the climate agreeably mild. Agriculture, arboriculture, and horticulture have been brought to high development. The natural pasturage is of fine quality, and affords abundant nourishment to immense herds of cattle. The forests are extensive. The country is watered by the Dnieper and its numerous affluents, which give communication with the Black Sea ports, and means of transit for corn, timber, and masts, of which last large quantities are annually floated down to Kherson. Bog iron ore is found in abundance. The inhabitants are noted for activity and industry; and M., from its great natural advantages, has now become one of the richest provinces of Russia.

In early times, M. belonged to the territory of the Russian prince of Smolensk, but was conquered by the Grand Duke of Lithuania; and was, with Lithuania, united to the kingdom of Poland. In 1772, it was seized by Russia at the first partition of Poland; and 1796, was joined to the govt. of Vitebsk, under the name *White Russia;* but since 1802, it has formed a separate government. Pop. (1890) 1,387,000; (1897) 1,708,041.

MOHI'LEV, or MOGI'LEV: capital of the govt. of M. in European Russia, and one of the finest towns of Russia; in the centre of the govt., on the right bank of the Dnieper, 100 m. s.w. of Smolensk. It is the seat of a Greek abp., and of the Rom. Cath. primate of Russia and Poland, besides being the favorite residence of many of the Russian nobility. It possesses a fine Greek cathedral, built 1780, 20 Greek, one Lutheran, and 4 Rom. Cath. churches, several synagogues, and a variety of religious, educational, and charitable institutions. Its streets are wide, straight, and well paved, and there is a fine promenade bordered with trees, whence a beautiful view of the valley of the Dnieper is obtained. One-third of the people are Jews. There is large export trade to the chief ports of the Baltic and Black Seas. Pop. (1880) 40,431; (1891) 45,311; (1897) 43,106.

MOHI'LEV, or MOGI'LOW: district town on the s.w. frontier of the govt. of Podolia, Russia; on the left bank of the Dniester, which separates it from the govt. of Bessarabia. It carries on active trade with the adjacent Russian provinces, and to some extent with Galicia and Roumania. The climate is so mild, that silk and other products of warm climates are extensively produced. Pop. (1880) 18,130; (1890) 20,975.

MÖHLER, *mö'lėr*, JOHANN ADAM: distinguished polemical divine of the Rom. Cath. Church: 1796, May 6—1838, Apr. 12; b. Igersheim, Würtemberg; of humble parentage. He received his early education at the Gymnasium of Mergentheim, whence, in his 17th year, he was transferred, for the higher studies, to the Lyceum of Ellwangen; and soon afterward entered on the theological course in the Univ. of Tübingen. He received priest's orders 1819; and for a short time was in missionary duty; but, 1820, he returned to college-life, and was engaged as classical tutor; but, 1822, the offer of a theological appointment in the Univ. of Tübingen, finally decided his choice of the study of divinity, and 1823, he entered on his new position. In 1828 he received the degree doctor of divinity, and was appointed ordinary prof. of theology. His earliest publication was a treatise *On the Unity of the Church* (1825), followed 1827 by a historico-theological essay on *Athanasius and the Church of His Time, in Conflict with Arianism.* But his reputation both contemporary and posthumous, rests mainly on his well-known *Symbolism; or the Doctrinal Differences between Catholics and Protestants, as represented by Their Public Confessions of Faith* (1832). This remarkable book at once fixed the attention of the theological world. It passed through five large editions in six years. It was translated into all the leading languages of Europe, and drew forth numerous criticisms and rejoinders, the most considerable of which is that of Dr. F. C. Baur (q.v.), 1833. To this M. replied 1834, by *Further Researches into the Doctrinal Differences of Catholics and Protestants.* The polemical bitterness evoked by these controversies made it desirable that M. should leave the Univ. of Tüb-

ingen. He was invited to Breslau, also to Bonn, but ultimately selected (1835) the Univ. of Munich, then in the first flush of its efficiency, under King Louis. His first appointment was nominally the chair of biblical exegesis, but he really applied himself to church history, in which his opening course was eminently successful; but, unhappily, a naturally delicate constitution began to give way under the constant fatigues of a student's life; and though he continued, under all these disadvantages, to maintain and to add to his reputation, and though 1837 the invitation to the Bonn professorship was renewed in still more flattering terms, he gradually sank under consumption, and died 1838. His miscellaneous works were collected and published posthumously, 2 vols. 8vo. (1839–40), by his friend, the now celebrated Dr. Döllinger. M. may be regarded as at once the most acute and the most philosophical of the modern controversialists of his church. He deals more, however, with the exposition of the points and the grounds of the doctrinal differences of modern sects, than with the discussion of the scriptural or traditional evidences of the peculiar doctrines of any among them.—M.'s thought was liberal, and his spiritual sympathy wide, and his *Symbolism* is singularly able and suggestive; yet his statement of Rom. Cath. doctrine is not fully accepted by his church; and Protestants consider that his strength was given rather to exposing the inconsistencies of the reformers and the weaknesses of various sects than to a discussion of the Reformation itself as a great movement of religious thought.

MO'HONK LAKE: mountain resort, remarkably picturesque and interesting, including an extensive area around a small lake near the summit of Sky-Top, in the Shawangunk Mountains, Ulster co., N. Y.; 15 m. w. of Poughkeepsie on the Hudson, 6 m. w. from New Paltz (on a branch of West Shore railroad), 88 m. from New York. Like the neighboring resort (9 m. distant), Lake Minnewaska (q.v.), M. L. presents a startling and impressive scene of massive rocks heaped in wonderful confusion, overhanging cliffs, and summits commanding views of six states. There are 35 m. of admirable roads within the estate and an excellent hotel with large accommodations. The lake itself is about half a mile long, and a few hundred ft. wide.

MOHUR, n. *mō'hėr* [Pers. *muhr*, a gold coin]: a gold coin of British India, equal to 15 or 16 rupees.

MOHURRUM, n. *mō-hŭr'rŭm* [Ar. *Muharram*, sacred, forbidden]: a Mohammedan festival in memory of Hassan and Houssein, nephews of the prophet; the first month of the Mohammedan year.

MOIDORE, n. *moy'dōr* [F. *moidore*, a spelling of the Port. *moeda d'ouro*, money of gold—from L. *monēta*, money; *de*, of; *aurum*, gold]: former gold coin of Portugal, of the value of 4,800 reis, or nearly 27*s.* sterling (*abt.* $6.57). It was called also *Lisbonine*.

MOIETY, n. *moy′ĕ-tĭ* [F. *moitié*, half—from L. *mędĭĕtātem*, the place in the middle]: the half; one of two equal parts; a part.

MOIL, v. *moyl* [OF. *moiller;* F. *mouiller*, to wet to soak—from a supposed mid. L. *mollĭārĕ*, to soften—from L. *mollis*, soft: It. *mollare*, to soak]: in *OE.*, to wet; to daub with dirt; to pollute; to wallow.

MOIL, v. *moyl* [see Moil 1, and comp. Gr. *molos*, labor, toil; L. *molĭor*, I toil; Gael. *maille*, slowness, painful effort]: to toil or labor; to drudge. Moil′ing, imp. Moiled, pp. *moyld*. Toil and moil, very hard and apparently hopeless labor. *Note.*—Moil 2 is probably only a secondary application of Moil 1, from the laborious efforts of one struggling through wet and mud, or from the frequent dirty state of the person who labors hard—see Wedgwood and Skeat.

MOIRE, n. *mwawr* [F. *moire:* formerly *mohère*, supposed from English *mohair*, itself prob. of eastern origin (see Mohair)]: clouded or mottled appearance on metallic or textile fabrics; watered or clouded silk; mohair. The silks for moire must be broad and of good substantial make; thin and narrow pieces are not suitable: they are wetted, and then folded with particular care, to insure the threads of the fabric lying all in the same direction, and not crossing each other, except as in the usual way of the web and the warp. The folded pieces of silk are then submitted to enormous pressure, generally in a hydraulic machine. By this pressure, the air is slowly expelled, and in escaping, draws the moisture into curious waved lines, which leave the permanent marking called watering.—The same process has been applied to woolen fabrics called Moreen, which is only an alteration of the word moire. Moire-antique, superior style of watered silk made to resemble the materials worn in olden times. Moire-métallique, *-mā′tăl-lēk′* [F.]: frosted or crystalline appearance produced for ornamental purposes on tin-plate; the tin-plate thus prepared. This appearance, as of frost on windows, is produced by dipping plates, in a heated state, into nitro-muriatic acid, and then washing with water, to remove the acid. When dry, the plates are varnished or lacquered, and have a pretty effect. The cheapness and ease of the process have made it very common for inferior articles in tin.

MOISSAC, *mwâ-sâk′:* town of France, dept. of Tarn-et-Garonne, on the river Tarn, 15 m. n.w. of Montauban. The church of St. Pierre dates from 1100, and contains some excellent carvings and curious fantastic sculptures. M. is the centre of important trade in grain. Pop. 6,000.

MOISSAN, *mwâ-sân,* HENRI: French chemist: b. Paris 1852, Sep. 28; d. 1907, Feb. 20. He was educated at the Museum of Natural History in Paris, and at the School of Pharmacy; taught in the Higher School of Pharmacy 1879-83, and then (1886) became its professor of toxicology. He isolated and liquefied fluorine, thus winning in 1887 the Lacaze prize from the Academy of Sciences; was transferred to the chair of mineral chemistry in the School of Pharmacy in 1889; and there won great fame by his important experiments and achievements with the electric furnace. In 1892 he made the manufacture of acetylene simple and commercially profitable by his discovery that if carbon and lime be fused in the electric furnace pure calcium will be formed, which makes the liberation of acetylene an easy matter. Much more spectacular was his formation of diamonds in 1893; iron was melted in the electric furnace and saturated with carbon; the furnace at a temperature of more than 4,000° C. (that is, more than 7,200° F.) was plunged into cold water; the resulting ingot was attacked with hot aqua regia; the iron was thus dissolved and diamonds were disclosed. Moissan wrote: *L'Isolement de Fluor* (1886); *Réproduetion du Diamant* (1893); *Etude complète des Carbones amorphes et des Graphites* (1898), and various articles for Fremy's *Encyelopédie Chimique.*

MOIST, a. *moyst* [OF. *moiste;* Milan. *moisc,* wet, damp: connected with L. *mustĕŭs,* new fresh—from *mustum,* new wine]: damp; wet in a small degree; juicy; containing water or other liquid; in *OE.,* fresh or new. MOIST'NESS, n. *-nĕs,* dampness; a slight degree of wetness. MOISTEN, v. *moys'n,* to wet in a small degree; to damp. MOISTENING, imp. *moys'nĭng.* MOISTENED, pp. *moys'nd.* MOISTENER, n. *moys'nėr,* he or that which moistens. MOISTURE, n. *moys'tūr* or *-ehûr,* a moderate degree of wetness; humidity; dampness. MOIS'TURELESS, a. *-lĕs,* without moisture.

MOKAH, n. *mō'ka* [Turk]: title of a doctor of law in Turkey.

MOKANNA, *mo-kân'na,* or ATHA-BEN-HAKIM. See HAKIM-BEN ALLAH; MOHAMMEDAN SECTS.

MOLAR, n. *mō'lėr* [L. *molāris,* a millstone—from *mola,* a mill: It. *molare;* F. *molaire,* molar]: a double tooth or grinder: ADJ. grinding; used for grinding, as a *molar* tooth.

MOLASSE, or MOLLASSE, n. *mŏ-lăs'* [F. *mollasse,* flabby, flimsy—from F. *mol;* L. *mollis,* soft]: in *geol.,* extensive Miocene or Middle Tertiary deposit, occupying the central lake-region of Switzerland between the Alps and the Jura. It consists chiefly of a loose sand, but at the foot of the Alps it usually takes the form of a conglomerate called 'Nagel-flue,' which is said to attain the astonishing thickness of 6,000 to 8,000 ft. in the Righi, near Lucerne, and in the Speer, near Wesen. The molasse contains a few shells and some vegetable remains, among which are several palms.